TURCK

Industrial Automation

USER-MANUAL RFID SYSTEM

INSTALLATION OF THE *BL IDENT*-SYSTEM

BL ident

S1583/01

Safety Instructions!

Before beginning installation work

- Disconnect the device from the power supply
- Ensure against accidental restart
- Verify isolation from the supply
- Cover or close off neighbouring units that are live.
- The assembly instructions provided for the device are to be complied with
- Only suitably qualified personnel according to EN 50 110-1/-2 (VDE 0105 part 100) are authorised to carry out work on this device/system.
- When conducting installation work ensure that you are free of electrostatic charge before touching the device.
- Connection and signal cables are to be installed so that any inductive or capacitive interference does not impair the automation functions.
- The installation of automation devices and their operating elements is to be carried out in such a way as to prevent unintentional operation.
- In order to prevent cable or wire breakage on the signal side generating undefined states in the automation devices, appropriate safety measures are to be taken for the I/O coupling on the hardware and software side.
- The functional earth (FE) must be connected to the protective earth (PE) or the equipotential bonding. The system installer is responsible for establishing this connection.
- Ensure a reliable isolation of the extra-low voltage for the 24 volt supply. Only those power supply units that comply with IEC 60 364-4-41, i.e. HD 384.4.41 S2 (VDE 0100 part 410) are to be deployed.
- Fluctuations or deviations of the mains voltage from the nominal value should not exceed the tolerance limits specified in the technical data, otherwise malfunctions and dangerous states may occur.

- Devices for mounting in housings or cabinets, desktop or portable units, are only to be operated and controlled with the housing closed.
- Measures are to be taken to ensure the correct restarting of a program following interruption due to a voltage drop or failure. Dangerous operating conditions, even short term, should not occur as a result. If required an emergency stop should be carried out.
- External measures are to be implemented at those locations where faults in the automation installation could lead to injury to persons or damage to property. These measures must guarantee safe operating conditions even in the event of a fault or malfunction (e.g. by means of independent limit switches or mechanical locking devices etc.).
- The electrical installation must be carried out in accordance with the relevant regulations (e.g. in respect of the cable cross sections,
  fuses and protective earth connections).
- All work involving transport, installation, commissioning and maintenance is to be carried out exclusively by qualified personnel (in accordance with IEC 60 364 i.e. HD 384 or DIN VDE 0100 and national accident prevention regulations).

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Documentation concept

This manual contains all the information necessary for professional installation of the *BL ident* systems particularly with regard to the data carriers and the read-write heads.

The following chapter provides an overview of the *BL ident* system, how to plan a *BL ident* system and indicates the necessary installation guidelines while providing a brief overview of the EMC directives. The manual also describes the functional principle of the data carriers and read-write heads, the technical data and operating data as well as the available accessories.

The manuals for BL67 and BL20 I/O modules contain information concerning the non bus-specific I/O modules of the modular TURCK BL67 and BL20 systems. You can find a short system description, a detailed function description of the I/O modules as well as all the information concerning topics such as mounting/dismounting and inscription. The manuals contain a short description of the I/O-ASSISTANT which is the engineering and configuration software for TURCK I/O products.

- Manual BL67 I/O Modules
  TURCK documentation number:
  German D300572/
  English D300529
- Manual BL20 I/O Modules
  TURCK documentation number:
  German D300716/
  English D300717

Also included are manuals concerning the PROFIBUS-DP and DeviceNet™ gateway of the BL67 and BL20 series. These include a short BL67 or BL20 system description and a description of the PROFIBUS-DP or DeviceNet™ fieldbus systems. Besides you will find exact details concerning the function and design of bus-specific gateways as well as all bus-specific information concerning the connection to different automation devices, the maximum system extension, etc.

- Manual BL67 PROFIBUS-DP
  TURCK documentation number:
  German D300570/
  English D300527

- Manual BL67 DeviceNet™
  TURCK documentation number:
  English D300528
- Manual BL20 PROFIBUS-DP
  TURCK documentation number:
  German D300822/
  English D300458
- Manual BL20 DeviceNet™
  TURCK documentation number:
  English D300460.

Further support can be found in the following manuals for engineering, installation and commissioning:

- Manual D101580 - This manual describes the professional application of *BL ident* interface modules.
- Manual D101578 - This manual includes instructions for commissioning of a *BL ident* systems using the function block “Proxy Ident Function Block”. The commissioning example is undertaken using a SIMATIC S7/-300 station (Siemens). SIMATIC STEP 7 standard software is used.
- Manual D101606 - This manual contains the software description for the so-called “Handheld” (programming device) which can be used to read data irrespective of the location.
- Manual D101584 - This manual contains the hardware description for the so-called “Handheld” (programming device) which can be used to read data irrespective of the location.

Description of symbols used

Warning

This sign can be found next to all notes that indicate a source of hazards. This can refer to danger to personnel or damage to the system (hardware and software).

This sign means for the operator: work with extreme caution.

Attention

This sign can be found next to all notes that indicate a source of potential hazards.

This can refer to possible danger to personnel or damage to the systems (hardware and software) and installations.

Note

This sign can be found next to all general notes that supply important information about one or more operating stages.

These specific notes are intended to make operation easier and avoid unnecessary work due to incorrect operation.

Attention

Please read this section carefully. Safety aspects cannot be left to chance when dealing with electrical equipment

This manual contains all the necessary information concerning the intended usage of TURCK products. It has been specially developed for qualified personnel who have the required level of expertise.

Prescribed use

Warning

The devices described in this manual must be used only in applications prescribed in this manual or in the respective technical descriptions, and only in connection with components and devices from third party manufacturers that have been certified.

Appropriate transport, storage deployment and mounting as well as careful operating and thorough maintenance guarantee trouble-free and safe operation of these devices.

Notes concerning planning / Installation of this product

Warning

It is imperative that all respective safety measures and accident protection guidelines be adhered to.

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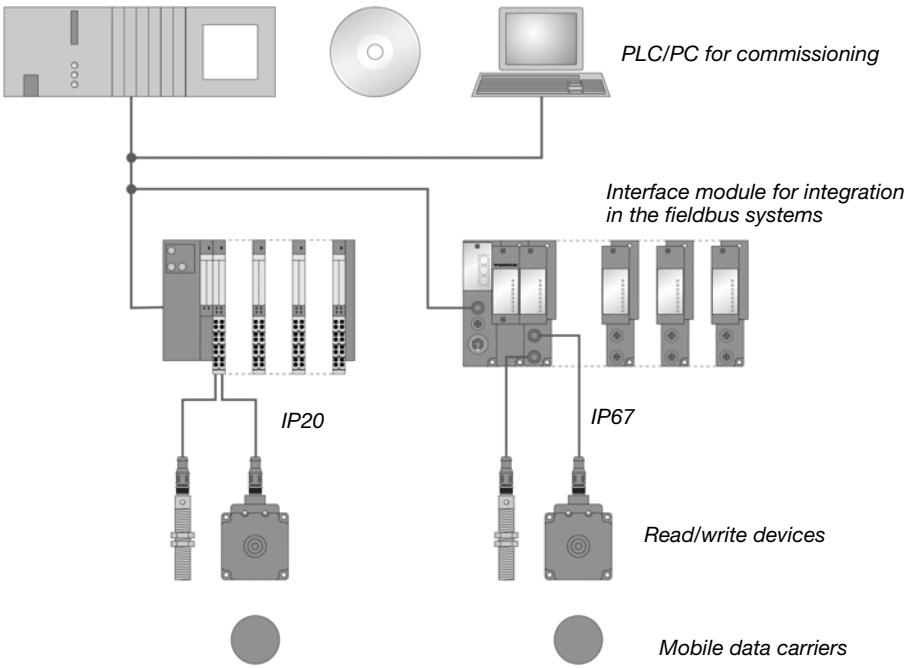
Schematic representation of the identification system *BL ident*

The TURCK *BL ident* system consists of several levels. Every level offers variation options. An application adapted to the overall system is possible.

Figure: 1
System overview



Support for *BL ident* projects

Further support can be found in the following software for engineering, installation and commissioning:

- For simulation and optimisation of an application a “*BL ident* configurator” is available free of charge on the internet at www. turck.com (see page 1 - 8).

Networking with *BL ident* systems

As it is possible to integrate *BL ident* systems in (existing) bus systems, networking of several *BL ident* systems is possible.

The guidelines which relate to the maximum extension of the respective bus systems apply.

A PROFIBUS system can only extend, for example, up to a maximum of 31 stations with 1 master when a repeater is not used.

Identification systems with radio frequency technology (RFID)

RFID is the abbreviation for Radio Frequency Identification.

An RFID system consists of a data carrier, a device for reading the data from the data carrier (read-write head) as well as other devices which perform the transfer and processing of data (interfaces).

The transfer of data from the data carrier to the read-write heads is undertaken using electromagnetic waves. This type of data transfer is non-contact, without a visual contact and is insensitive to dirt and temperature fluctuations.

The data carriers can be attached directly to a product. Further terms used for the data carriers are TAGs or transponders. The data content can consist of production and manufacturing data. Important it that this data identifies the product. This is the origination of the term “Identification System”.

A whole range of possibilities exist as the data content can be changed by writing on the data carrier. Accordingly, the production and manufacturing processes can be traced and monitored. Logistics/distribution can be optimized.

The “Identifications Systems” can be integrated into (existing) fieldbus systems (e.g. PROFIBUS). The integration of the respective fieldbus system is undertaken with suitable interfaces.

Standardized software modules (e.g. the Proxy Ident Function Block for PROFIBUS) enable simple system integration and commissioning with different controls.

Characteristics and fields of application of the *BL ident* system

In order to comply with the demands presented by different fields of application, TURCK offers the *BL ident* system with a whole range of combination possibilities of data carriers and read-write heads as well as interfaces for integration into fieldbus systems (e.g. PROFIBUS-DP). Software modules enable simple integration and commissioning.

The characteristics of the TURCK *BL ident* system are listed in the following:

Degree of protection

All data carriers as well as the suitable write-read heads feature a high mechanical degree of protection (e.g. **IP67**) and can thus be subject to the most harsh industrial conditions.

The integration into a fieldbus system is implemented with suitable TURCK interface modules. The interface modules are available in degrees of protection IP20 and IP67. TURCK connection cables featuring an adequate degree of protection round off the identification system.

Service life

The service life results from the possible number or read-write operations on the data memory.

FRAM memory features an **unlimited** number of read operations and 10^{10} write operations.

EEPROM memory features an **unlimited** number of read operations and 10^{5} write operations.

The data carrier does not require batteries.

Transmission frequency

The TURCK *BL ident* system operates with **13.56 MHz** transmission frequency between the data memories and the read/write devices. Systems which operate with these transmission frequencies are practically immune to electromagnetic interference. The 13.56 MHz transmission frequency has developed into a standard in many RFID fields of application.

Size

TURCK supplies the data carriers with diameters of 16, 20, 30 and 50 mm.

The read-write units are available in different housing styles ranging from cylindrical M18 and M30, to rectangular CK40 and Q80 and ring-shaped S32XL.

Memory capacity

The memory capacity on the data storage device is **64 Bytes** or **128 Bytes** with an EEPROM memory and **2 KBytes** with an FRAM memory. New data carriers are in the design stage.

FRAM: (Ferroelectric Random Access Memory), non-volatile, high service life based on the higher number of write-read operations (10^{10} up to 10^{11})

EEPROM: (Electrically Erasable Programmable Read Only Memory), non-volatile

Write time/read time (air interface only)

The write and read times depend for all data carriers on the number of bytes which are to be transferred. On FRAM data carriers the read and write time are almost identical and are between 0.7 and 3.4 ms/byte. On EEPROM data carriers the read time is between 0.7 and 6 ms/byte and the write time is between 3.3 and 7.9 ms/byte.

The write-read distances depend on the corresponding combination of data carrier and read-write head, and can be between 0 and 200 mm. With the *BL ident* configurator the application variables speed, range and data quantity can be varied and the optimum combination can be selected for the respective application. The configurator is available online at http://www.turck.com/ (also see page 1 - 8).

Compatibility

All technical data relates to the *BL ident* system, i.e. to the combinations of *BL ident* data carriers, read-write heads and interface modules. Completely different values may apply for data carriers from other manufacturers. Therefore they may only be used after prior approval by TURCK.

Areas of application (examples):

The characteristics as stated beforehand allow the application of a TURCK *BL ident* system in the following fields:

- Automotive
- Transport and handling
- Machine (mechanical) engineering
- Food and beverages
- Chemicals
- Pharmaceuticals and petrochemicals.

Possible areas of application are:

- Assembly lines
- Conveyors
- Industrial manufacturing
- Warehousing
- Logistics
- Distribution
- Component picking
- Transport logistics

The *BL ident* configurator

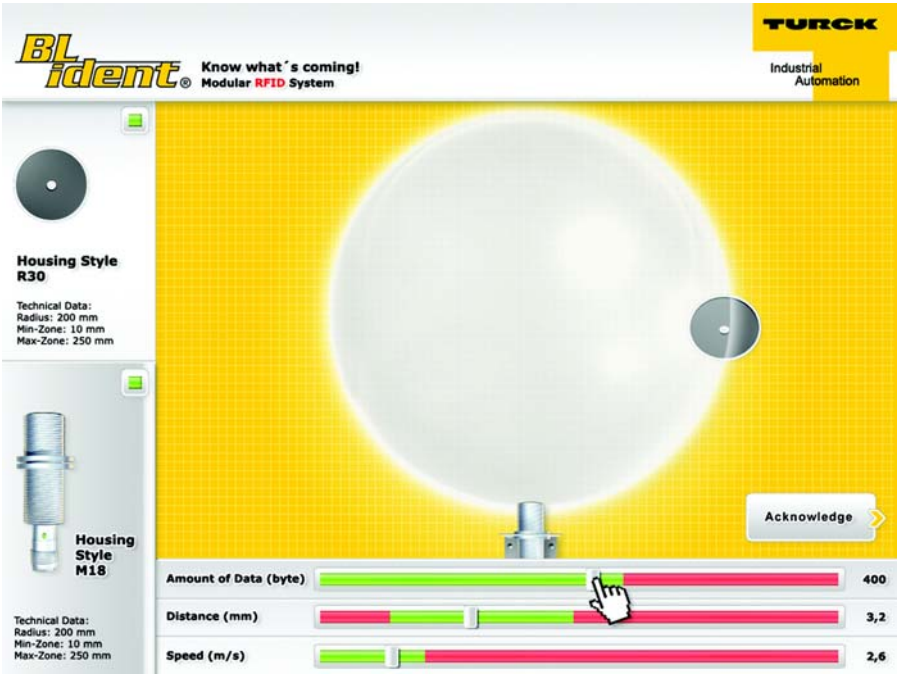
The use of sensors and actuators – and even fieldbusses – is state-of-the-art in many industrial fields. When RFID systems are used on the other hand, there are always questions relating to the air-interface, e.g. "How fast and at which distance can I move the data carrier past the write-read heads?". That is to say that there is a certain amount of general uncertainty concerning the range of applications of an RFID system.

General details such as "recommended write-read distance" or "transmission speed = 0.5 ms/ byte" are usually not sufficient for evaluation of the usage of the devices in a determined application, as the application variables such as data quantity, speed and distance are the result of a complex interaction between the read-write heads and data carriers.

With the “*BL ident* configurator” the respective application can be simulated and the correct preliminary selection can be made.

The setting of applications parameters by "playing" with the values allows the user to easily test the options and limits associated with the respective combinations.

Figure: 2
BL ident
configurator



The online variants of the configurator (available free on the Internet at www.turck.com) accesses the data in the TURCK product database and always provides the most up-to-date information.. In addition to simulating the application, the configurator also generates the corresponding data sheets and documentation.

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Selection criteria for data carriers, read-write head and interface module

The application should be judged using the following criteria in order to make the correct selection of *BL ident* system components:

- Mechanical dimensions
- Distance from data carriers to read-write heads when reading and writing
- Tolerances in the mechanical guidance
- Static and/or dynamic transfer of data
- Data quantities to be transferred
- Speed with dynamic writing and reading (on the fly)
- Metal-free areas with data carriers and read-write heads
- Ambient conditions such as humidity, temperature, chemical influences, etc.

There are special selection criteria relating to read-write heads:

- Mechanical dimensions
- Required transfer zone
- Size of the data carrier in use

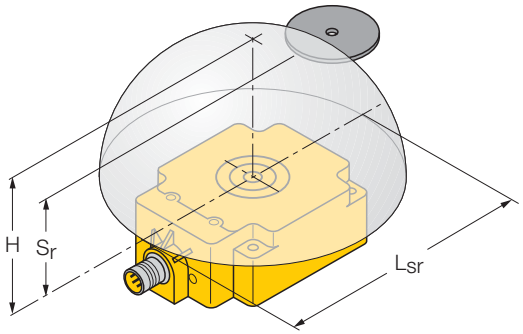
The following criteria should be considered specially for the use of the interface modules:

- Degree of protection
- Bus type
- Number of channels

Transfer zone and read-write distance

The read-write head generates an alternating inductive field. The recommended read-write distance results from the combination of data carrier and read-write head. The appearance of the distribution of this field depends on the design of the antenna in the data carrier and in the read-write head.

Figure 1
Transfer zone



Exchange of data is only possible within the transfer zone (Fig. 1) with the parameters L_{sr} = length of the transfer zone and S_r = recommended write-read distance. The transfer zone reduces when the distance from the data carrier to the read-write head increases and is reduced to a point at the threshold distance H, i.e. as the distance increases less data can be transferred or the speed at which the read-write head moves past the data carrier must be reduced.

Note

Using the *BL ident* configurator at www.turck.com allows the relationships to be simulated.

Length of the transfer zone L_{Sr} and width offset

The length of the transfer zone L_{Sr} (Fig. 1) is dependent on the combination of data carrier and read-write head.

The width is particularly important for the tolerance of mechanical tracking.

Note

An illustrative representation of this relationship can be found in the *BL ident* configurator at www.turck.com.

Minimum distance of the data carriers to read-write head, influence of adjacent fields

Adjacent fields are practically always available. The adjacent fields should not be used for transfer of data, so normally there must be an minimum distance between data carriers and read-write head. But with the TURCK *BL ident* system a minimum distance must not be observed.

Permissible direction of movement and alignment of the data carrier

The data carrier can pass over the read-write head from any direction.

The data carriers can have any horizontal alignment. They should only be aligned in parallel to the read-write head.

Reading and writing in static operation

In static operation a data exchange is possible up to the range of the threshold distance H. The data carrier must be positioned exactly above the read-write head.

Reading and writing in dynamic operation (on the fly)

In dynamic operation the data carriers move past the read-write head. A data exchange is only possible within the transfer zone.

Dwell time of the data carrier T_d

The dwell time T_d is the time in which the data carrier is present in the transfer zone of the read-write head as it passes by. The read-write head exchanges data with the data carrier during this time.

The dwell time T_d is calculated as follows:

$T_d = L_{Sr} / V_{Tag}$

where:

L_{Sr}:length of the transfer zone
V_{Tag}:speed of the data carrier in dynamic operation

In static mode the dwell time can be as long as necessary. The dwell time must be long enough to ensure that communication with the data carrier has been completed.

In dynamic operation the dwell time is defined by the system environment. The dwell time must be matched to the data quantity to be transferred. Conversely, this means that the shorter the dwell time, the lower the quantity of data to be transferred.

Note

At www.turck.com various examples relating to this topic can be examined with the *BL ident* configurator.

Calculation of the maximum quantity of user data in dynamic operation

The calculation of the maximum user data quantity is dependent on the read-write head used and the corresponding data carrier.

Example:
Read-write head: TB-M18-H1147,
Data carrier: TW-R30-K2
Pass speed: 0.5 m/s

- The read-write head contacts the data carrier when it is entering the transfer zone: This takes about 2.7 ms.
- With the second contact to the data carrier the read-write head recognizes the data carrier. A signal is sent to the interface module: Duration about 12 ms.
- The interface module sends a read-write command, e.g. read 4 bytes, incl. version and feedback of the data on the interface module: Duration about 7 ms.

This results in total to about 22 ms.

Until 4 bytes of data have been processed by the interface module takes about 5 ms/byte.

This means when the data carrier passes the read-write head, a max. of 8 bytes can be read or written.

Note

With the BL ident configurator at www.turck.com different operating states in dynamic operation can be simulated and represented.

Minimum distances between two adjacent data carriers

The minimum distance between two data carriers is dependent on the size of the data carrier and the read-write head.

In dynamic operation (on the fly) the minimum distance is still dependent on the data quantity and the bus cycle time.

Note

Corresponding tests for determination of the minimum distance should be undertaken before commissioning.

3 Installation guidelines

Overview 2
Reduction of metallic influences 2
Installation of several read-write heads on metal frames or metal supports 3
No mounting of the data carrier directly on metal 6
Conclusion – influence on the transfer from metal 7

Overview

Because of the inductive operating principle of the data carriers and read-write heads, every type of metal (particularly iron and ferromagnetic materials) should be avoided in proximity of these devices, as they will influence the manner in which they function.

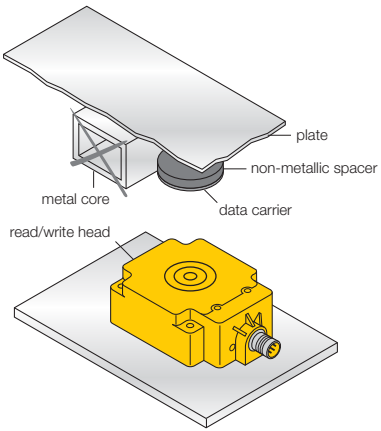
It is necessary to observe the following important points during engineering and installation:

- Minimum distance between read-write heads
- Minimum distance between two adjacent data carriers (see chapter 2, page 2 - 6)
- Metal-free areas with installation of read-write heads and data carriers on metals
- Installation of several read-write heads on metal frames or metal supports.

Reduction of metallic influences

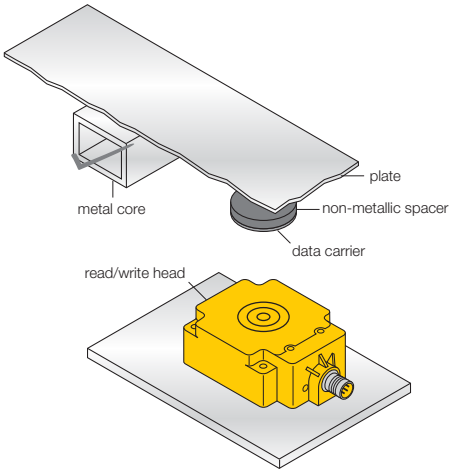
Problem: A metal support is located above the transfer zone of the read-write head. This influences the entire field. Specifically, the transfer zone between read-write head and data carrier is reduced (Fig. 1).

Figure 1
Interfering metal supports.



Remedy: Install the data carriers in a different manner and there will no longer by an influence on the transfer zone (Fig. 2).

Figure 2
Other arrangement of the data carrier



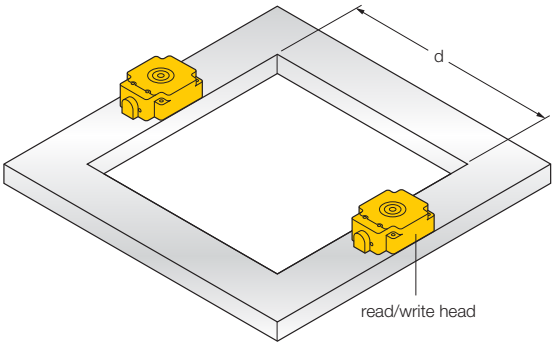
Installation of several read-write heads on metal frames or metal supports

Every read-write head which is mounted on metal couples a part of the field to the metal support. If the minimum distance d and the metal-free zones are observed, there is generally no mutual influence. If however a metal frame should have an unfavourable form an influence is still possible. This results in longer data transfer times and error messages in the interface module.

Problem: Mutual interference of the read-write heads

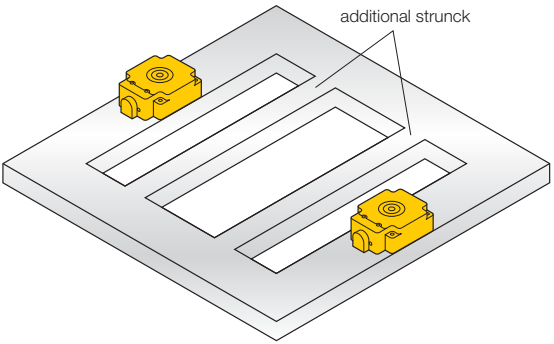
Remedy 1: Extend the distance d between both read-write heads (Fig. 3).

Figure 3
Extending the distance



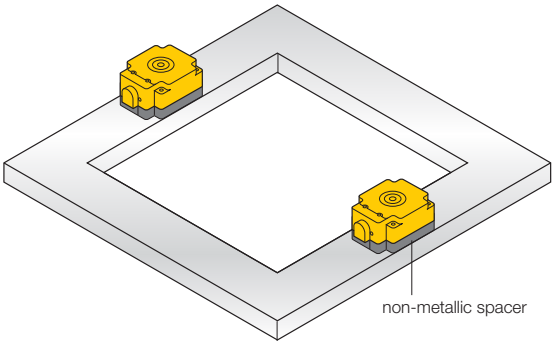
Remedy 2: Fit one or several iron struts which should short-circuit the parasitic fields (Fig. 4).

Figure 4
Fitting iron struts



Remedy 3: Place a non-metallic intermediary element of 20 to 40 mm thickness between the read-write head and the iron frame. This will significantly reduce the parasitic coupling of the field and the support (Fig. 5).

Figure 5
Addition of an intermediary non-metallic element

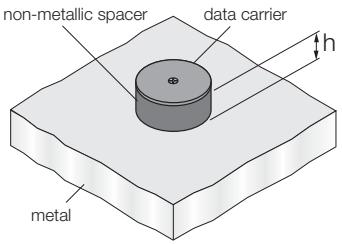


Remedy 4: It is also possible to contact the read-write heads via the function block (PLC) and to use it to switch them on and off. The influence through another read-write head can be avoided using the selective mode, where the channel in whose transfer window the data is located is active (see manual *BL ident* Proxy-Ident-Block (PIB), D101578). Using this method the adjacent read-write heads do not emit a field and there is no mutual interference.

No mounting of the data carrier directly on metal

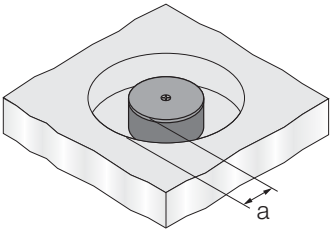
The data carriers (with the exception of high temperature data carriers) may not be mounted directly on metal. Non-metallic spacers (see chapter 9, Accessories) enable mounting which does not lead to an interruption of the functions (Fig. 6).

Figure 6 Installation with spacers



The data carriers may not be mounted so that the necessary minimum distance to metal and to the data carriers around them is less than the minimum distance. The minimum distance is dependent on the housing design of the read-write head; a = 10 mm around the data carrier can be assumed (Fig. 7). The high temperature data carrier (see page 5 - 2, table 1) can be constructed so that it can be mounted directly on metal without the need for additional measures.

Figure 7 Installation considering the minimum distance from metal



Conclusion – influence on the transfer from metal

The following points should be considered with the installation of the *BL ident* components:

- Data carriers (except high temperature data carriers) can not be mounted directly on metal or suitable accessories must be used (spacers)
- It is important to ensure that no metallic rails (or similar parts) intersect the transfer zone. The metal rails would interfere with the field data.
- Only plastic or stainless steel screws can be used for attachment of the read-write heads.

4 EMC directives

For whom are the EMC directives intended? 2

Dispersion of electromagnetic interference 2
- How can RFID be subject to interference? 3
- Coupled interference 3

What does EMC mean? 4

Fundamentals for EMC protection 5
- Installation in a switch cabinet 6
- Avoiding sources of interference 7
- Potential equalization 7
- Shielding the cable 7

For whom are the EMC directives intended?

These EMC directives are intended for:

- Project engineers and planners who are planning the system with the RFID modules to be configured.
- Installation personnel, service technicians and engineers, who use this description to correctly lay the connection cables or have to remedy the existing problems during a malfunction.

In this chapter you will learn more about the EMC guidelines, particularly:

- Dispersion of electromagnetic interference
- What does EMC mean?
- Fundamentals for EMC protection
- Installation in a switch cabinet
- Avoiding sources of interference
- Potential equalisation
- Shielding the cable

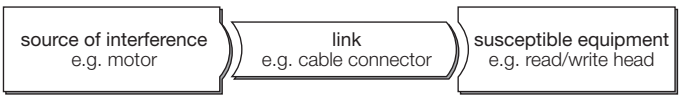
Dispersion of electromagnetic interference

In a system or installation electromagnetic interference can only occur if the following components are mutually present:

- Source of interference
- Interference path
- Susceptible equipment.

If one of these components is not present (for example the interference path), no interference will occur even if the source of interference sends high levels of interference (Fig. 1):

Figure 1 Interference components



The measures for prevention of the interference (EMC) are relevant for all three components. The manufacturer is obliged to undertake all possible measures to counter the development of sources of interference.

The installation design must be implemented to ensure that mutual interference of the individual components is avoided or kept to as low a level as possible.

How can RFID be subject to interference?

- Problem: interference radiation from the power supply when switching mode power supplies are used.
  Remedy: use of a stabilized power supply
- Problem: interference via the serial connection cable.
  Remedy: improved cable shielding and/or read-write head earthing
- HF interference via the antenna from another read-write head or via an external source of interference which operates using the same frequency.
  Remedy: the interference from another read-write head can be avoided by using the selective mode (see manual *BL ident* Proxy-Ident-Block (PIB), D101578).

Coupled interference

There are four possibilities for coupled interference:

- Galvanic coupled interference
- Capacitive coupled interference
- Inductive coupled interference
- Radiated interference

There are different causes for the radiated interference on the data interface paths:

With cables and wiring:

- Incorrect or poorly laid
- Missing or incorrectly connected shield
- Unfavourable arrangement of the cable

With the switch cabinet or housing:

- Missing or incorrectly wired potential equalization wiring
- Missing or incorrect earthing
- Unfavourable arrangement
- Modules which are not mounted in a fixed position
- Unfavourable switch cabinet design.

What does EMC mean?

The increasing component density, increased switching speed of power electronics and the continuous rise in switching speeds present more and more sources of interference to electronic elements of a system. The following generally applies: the higher the level of automation, the higher the danger of mutual interference.

Definition of EMC:

“Electromagnetic compatibility (EMC) is the capability of an electrical or electronic device in an electromagnetic environment to function without fault, without influencing or interfering with the environment beyond defined limits.”

The TURCK *BL ident* devices are subjected to test compliance to the following standards:

- EN 61000-4-2 (ESD)
- EN 61000-4-3 (Electromagnetic fields)
- EN 61000-4-4 (Burst)
- EN 61000-4-5 (Surge)
- EN 61000-4-6 (immunity to conducted disturbances induced by radio-frequency fields)

As the RFID modules are only components of an overall system and sources of interferences can result from the combination of different components, the design of a system or installation must be subject to certain guidelines.

In order to obtain an installation which is immune to interference, a whole package of measures must be implemented; where the operator of the system or installation is responsible for the RFI suppression. They must observe and comply with the local and national stipulations and directives. All measures, which have been

undertaken during system design save expensive modifications and elimination of interference at a later date.

Fundamentals for EMC protection

The following elementary rules relating to electromagnetic compatibility (EMC) must be observed:

- **Shielding by a housing**
  Protect the device from external sources of interference by the installation in a switch cabinet or housing. The cabinet or the housing must be included in the connection to earth.
  Shield the electromagnetic fields from inductances by partition panels of devices. Use shielded data transmission cables with metallic connector housings.
- **Large area ground connections**
  Connect all inductive metal parts over a large area and use a low resistance for radio frequencies. Establish a large area connection between the inactive metal parts and the central earthing point.
  Integrate the shield earth into the earthing concept, i.e. the end of the shield must be connected to a large area to earth.
- **Planning of the cable routes**
  Divide the cables into power groups and lay them separately. Lay the high power cables and the data cables in separate ducts or bundles.
  Introduce the entire cabling into the cabinet only from one side and on a single level when possible.
  Lay the data cables as close to earthed surfaces as possible.
  Twist the incoming and outgoing cables of individually laid conductor pairs.
  In many cases an independent cable guidance for the bus cable is already provided. Ideally this should also be used for laying the data cables between read-write heads and interface modules.
- **Shielding of cables**
  Shield the data transfer cables and apply the shield on gateway side. Shield the analogue cables and apply the shield at one end, e.g. on the drive unit.
  Always apply the cable shields at the entry to the switch cabinet to a large area on the grounding bar and attach them with fixing clamps.

Connect the applied shield to the module without interruption.
Use a braided shield and not a metal foil shield.

- **Mains and signal filter**
  Use the mains filter with metal housing.
  Connect the filter housing on a wide area and with a low radio frequency resistance to the switch cabinet earth.
  Never attach the filter housing to painted surfaces.
  Attach the filter at the switch cabinet entry or in the direction of the interference source.

Installation in a switch cabinet

Metal housings shield susceptible equipment against magnetic and electrical fields as well as electromagnetic waves. The better that the induced interference current can flow, the better that the interference field will weaken itself. It is therefore essential to ensure that all housing panels are connected electrically conducting to each other.

If the switch cabinet panels are insulated from one another, an RF conductive connection using metal braiding and RF clips or RF paste (the greater the surface area of the connection the better) must be possible.

Interference can be avoided by optimum switch cabinet design. The following generally applies:

- The effects of the interference generally reduce as the distance between the susceptible equipment and the source of interference increases.
- An additional reduction in interference can be achieved by installation of shield panels
- Signal cables should keep a minimum distance of at least 10 cm from high power cables.

External interference induced through the mains is avoided by the installation of mains filters. Ensure that the mains filter is correctly rated and fitted directly at the entry to the switch cabinet.

Avoiding sources of interference

Avoid the installation of sources of interference which occur primarily due to switched inductances.

Interference is generated primarily by relays, contactors, fluorescent lamps in the switch cabinet and valves, and can be avoided by the use of RC combinations, freewheel diodes etc. This also avoids inductive interference in the cables which are laid parallel to the coil cables.

Potential equalisation

If the system sections are subject to a different design and different voltage levels result, potential differences can result between the different sections of the system. Equalization currents then flow via signal cables (potential equalization should not be confused with a protective earth).

Therefore correctly implemented potential equalization is essential. The following points should be observed:

- The potential equalization cable must have a sufficient cross-section (min. 10 mm^2).
- The distance between signal cables and the respective potential equalization cable must be as small as possible.
- A stranded conductor must be used.
- If the potential equalization cables are connected to the central potential equalization bars, the power components and the non-power components must be combined.

Shielding the cable

Signal cables must be shielded in order to avoid coupled interference. Even though the best shielding effect when laying the cables is achieved by using steel ducts, the use of cables with braided shields is usually sufficient. Decisive for the effect of the shield in both cases is however the correct connection, as a non-connected or incorrectly connected shield has no effect.

The following must be observed:

- As the interference signals are frequently in a range > 10 kHz, a large area shield connection is necessary.
- The shield bar is very conductive and connected over a large area with the switch cabinet housing and must be as near as possible to the cable entry. The cable must be stripped and connected to the grounding bar with an RF clip or cable tie.
- The shielding bar must be connected with the PE bar.
- If shielded cables have to be interrupted, the shield must continue via the corresponding connector housing using suitable connectors.
- If intermediate connectors are used which do not feature a suitable shield, the shield must be connected via cable clips to the point where it is interrupted.

5 Description of the data carrier

Type overview 2

Function principle....3
- Memory module 3
- Data carrier electronics 4
- Data carrier antenna 4

Technical data
- TW-R16-HT-B128 5
- TW-R20-HT-B128 7
- TW-R22-HT-B64 9
- TW-R22-HT-B128 11
- TW-R30-HT-B128 13
- TW-R50-HT-B128 15
- TW-R20-HT-K2 17
- TW-R30-HT-K2 19
- TW-R50-HT-K2 21
- TW-R16-B128 23
- TW-R20-B128 25
- TW-R30-B128 27
- TW-R50-B128 29
- TW-R20-K2....31
- TW-R30-K2....33
- TW-R50-K2....35

Type overview

Table 1: Data carrier type overview

Type	Memory size	Memory type	Highly temperature resistant
TW-R16-HT-B128	128 Bytes	EEPROM	✔
TW-R20-HT-B128	128 Bytes	EEPROM	✔
TW-R22-HT-B64	64 Bytes	EEPROM	✔
TW-R22-HT-B128	128 Bytes	EEPROM	✔
TW-R30-HT-B128	128 Bytes	EEPROM	✔
TW-R50-HT-B128	128 Bytes	EEPROM	✔
TW-R20-HT-K2	2 KBytes	FRAM	✔
TW-R30-HT-K2	2 KBytes	FRAM	✔
TW-R50-HT-K2	2 KBytes	FRAM	✔
TW-R16-B128	128 Bytes	EEPROM	–
TW-R20-B128	128 Bytes	EEPROM	–
TW-R30-B128	128 Bytes	EEPROM	–
TW-R50-B128	128 Bytes	EEPROM	–
TW-R20-K2	2 KBytes	FRAM	–
TW-R30-K2	2 KBytes	FRAM	–
TW-R50-K2	2 KBytes	FRAM	–

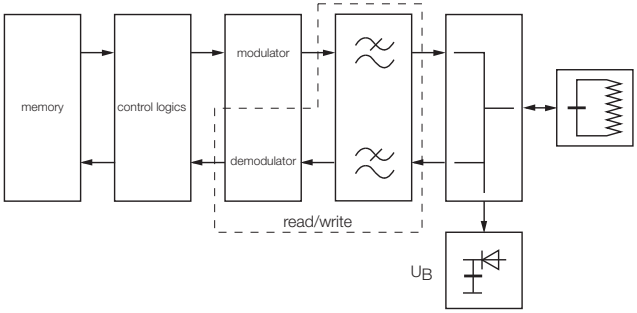
Function principle

The *BLident* data carriers (TAGs) can be written and read on a non-contact basis using the corresponding read-write heads. The operating frequency is 13.56 MHz.

The data carriers are passive, i.e. without batteries. If the data carriers enter the transfer range of a read-write head, the energy is inductively coupled and the data transfer is initiated.

The achievable distances vary depending on the sizes from 15…200 mm. All housing styles (with the exception of the TW-R16...-B128, EEPROM only) are available both as EEPROM and FRAM memory variants. The *BLident* data carrier consists of a memory module, electronics and an antenna (see Fig. 1).

Figure 1
Block diagram
Data carrier



Memory module

The information on the data carrier can be read – and new data can also be added (read/write). The memory size is 64 Bytes, 128 Bytes or 2 KBytes.

The memory consists alternatively of the following components:

- EEPROM: unlimited read but limited write cycles are possible (10^5). No battery required.
- FRAM = ferroelectric memory: unlimited read and almost unlimited write cycles are possible (10^{10}). No battery required.

The data retention time of the memory is:

- 1 year at 85 °C,
- 10 years at 55 °C,
- 120 years at 25 °C.

Electrical fields do not have an influence as they are normally have a frequency which is much too low to erase the memory.

Data carrier electronics

The electronics ensure the communication on the data carrier side with the read-write head.

Data carrier antenna

The antenna is designed as an air coil and is used to transfer data and energy between the data carrier and the read-write head.

Technical data TW-R16-HT-B128

Figure 2
TW-R16-HT-B128

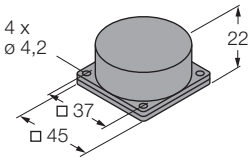


Table 2:
TW-R16-HT-B128

Type	**TW-R16-HT-B128**
Ident-No.	1542322
Memory data	
Operating frequency	13.56 MHz
Memory size	128 Bytes
Number of read operations	unlimited
Number of write operations	10^5
Read time (typical)	0.5…5 ms/Byte
Write time (typical)	3…6 ms/Byte
Memory type	EEPROM
Installation guidelines	
Minimum distances when mounting in metal (around the data carrier)	10 mm
General data	
Colour	black
Ambient temperature	-40…+210 °C (time-dependent)

Table 2: TW-R16-HT-B128

Type Ident-No.	**TW-R16-HT-B128** 1542322
Storage temperature	-25…+120 °C
Degree of protection (IEC 60529/EN 60529)	IP68
Housing material	PA66

Technical data TW-R20-HT-B128

Figure 3
TW-R20-HT-B128

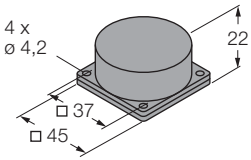


Table 3:
TW-R20-HT-B128

Type	**TW-R20-HT-B128**
Ident-No.	1542324
Memory data	
Operating frequency	13.56 MHz
Memory size	128 Bytes
Number of read operations	unlimited
Number of write operations	10^5
Read time (typical)	0.5…5 ms/Byte
Write time (typical)	3…6 ms/Byte
Memory type	EEPROM
Installation guidelines	
Minimum distances when mounting in metal (around the data carrier)	10 mm
General data	
Colour	black
Ambient temperature	-40…+210 °C (time-dependent)

Table 3: TW-R20-HT-B128

Type Ident-No.	**TW-R20-HT-B128** 1542324
Storage temperature	-25…+120 °C
Degree of protection (IEC 60529/EN 60529)	IP68
Housing material	PA66

Technical data TW-R22-HT-B64

Figure 4
TW-R22-HT-B64

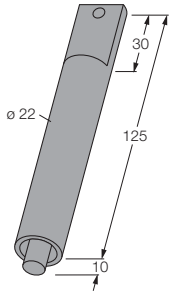


Table 4:
TW-R22-HT-B64

Type	**TW-R22-HT-B64**
Ident-No.	1542323
Memory data	
Operating frequency	13.56 MHz
Memory size	64 Bytes
Number of read operations	unlimited
Number of write operations	10^5
Read time (typical)	0.5…5 ms/Byte
Write time (typical)	3…6 ms/Byte
Memory type	EEPROM
Installation guidelines	
Minimum distances when mounting in metal (around the data carrier)	10 mm
General data	
Colour	black
Ambient temperature	-40…+210 °C (time-dependent)

Table 4: TW-R22-HT-B64

Type Ident-No.	**TW-R22-HT-B64** 1542323
Storage temperature	-25…+120 °C
Degree of protection (IEC 60529/EN 60529)	IP68
Housing material	PA66

Technical data TW-R22-HT-B128

Figure 5
TW-R22-HT-B128

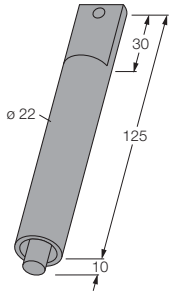


Table 5:
TW-R22-HT-B128

Type	**TW-R22-HT-B128**
Ident-No.	1542341
Memory data	
Operating frequency	13.56 MHz
Memory size	128 Bytes
Number of read operations	unlimited
Number of write operations	10^5
Read time (typical)	0.5…5 ms/Byte
Write time (typical)	3…6 ms/Byte
Memory type	EEPROM
Installation guidelines	
Minimum distances when mounting in metal (around the data carrier)	10 mm
General data	
Colour	black
Ambient temperature	-40…+210 °C (time-dependent)

Table 5: TW-R22-HT-B128

Type Ident-No.	**TW-R22-HT-B128** 1542341
Storage temperature	-25…+120 °C
Degree of protection (IEC 60529/EN 60529)	IP68
Housing material	PA66

Technical data TW-R30-HT-B128

Figure 6
TW-R30-HT-B128

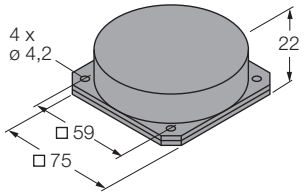


Table 6:
TW-R30-HT-B128

Type	**TW-R30-HT-B128**
Ident-No.	1542325
Memory data	
Operating frequency	13.56 MHz
Memory size	128 Bytes
Number of read operations	unlimited
Number of write operations	10^5
Read time (typical)	0.5…5 ms/Byte
Write time (typical)	3…6 ms/Byte
Memory type	EEPROM
Installation guidelines	
Minimum distances when mounting in metal (around the data carrier)	–
General data	
Colour	black
Ambient temperature	-40…+210 °C (time-dependent)

Table 6: TW-R30-HT-B128

Type Ident-No.	**TW-R30-HT-B128** 1542325
Storage temperature	-25…+120 °C
Degree of protection (IEC 60529/EN 60529)	IP68
Housing material	PA66

Technical data TW-R50-HT-B128

Figure 7
TW-R50-HT-B128

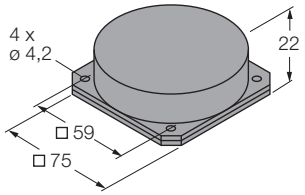


Table 7:
TW-R50-HT-B128

Type	**TW-R50-HT-B128**
Ident-No.	1542326
Memory data	
Operating frequency	13.56 MHz
Memory size	128 Bytes
Number of read operations	unlimited
Number of write operations	10^5
Read time (typical)	0.5…5 ms/Byte
Write time (typical)	3…6 ms/Byte
Memory type	EEPROM
Installation guidelines	
Minimum distances when mounting in metal (around the data carrier)	–
General data	
Colour	black
Ambient temperature	-40…+210 °C (time-dependent)

Table 7: TW-R50-HT-B128

Type Ident-No.	**TW-R50-HT-B128** 1542326
Storage temperature	-25…+120 °C
Degree of protection (IEC 60529/EN 60529)	IP67
Housing material	PA66

Technical data TW-R20-HT-K2

Figure 8
TW-R20-HT-K2

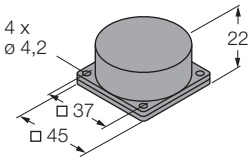


Table 8:
TW-R20-HT-K2

Type Ident-No.	**TW-R20-HT-K2** 1542327
Memory data	
Operating frequency	13.56 MHz
Memory size	2 KBytes
Number of read operations	unlimited
Number of write operations	10^{10}
Read time (typical)	0.5…5 ms/Byte
Write time (typical)	0.5…5 ms/ByteByte
Memory type	FRAM
Installation guidelines	
Minimum distances when mounting in metal (around the data carrier)	–
General data	
Colour	black
Ambient temperature	-40…+210 °C (time-dependent)

Table 8: TW-R20-HT-K2

Type Ident-No.	**TW-R20-HT-K2** 1542327
Storage temperature	-20…+85 °C
Degree of protection (IEC 60529/EN 60529)	IP68
Housing material	PA66

Technical data TW-R30-HT-K2

Figure 9
TW-R30-HT-K2

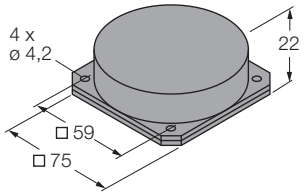


Table 9:
TW-R30-HT-K2

Type	**TW-R30-HT-K2**
Ident-No.	1542328
Memory data	
Operating frequency	13.56 MHz
Memory size	2 KBytes
Number of read operations	unlimited
Number of write operations	10^{10}
Read time (typical)	0.5…5 ms/Byte
Write time (typical)	0.5…5 ms/Byte
Memory type	FRAM
Installation guidelines	
Minimum distances when mounting in metal (around the data carrier)	–
General data	
Colour	black
Ambient temperature	-40…+210 °C (time-dependent)

Table 9: TW-R30-HT-K2

Type Ident-No.	**TW-R30-HT-K2** 1542328
Storage temperature	-20…+85 °C
Degree of protection (IEC 60529/EN 60529)	IP68
Housing material	PA66

Technical data TW-R50-HT-K2

Figure 10
TW-R50-HT-K2

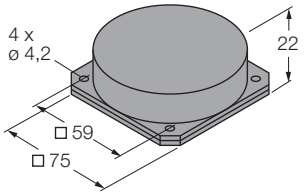


Table 10:
TW-R50-HT-K2

Type	**TW-R50-HT-K2**
Ident-No.	1542329
Memory data	
Operating frequency	13.56 MHz
Memory size	2 KBytes
Number of read operations	unlimited
Number of write operations	10^{10}
Read time (typical)	0.5…5 ms/Byte
Write time (typical)	0.5…5 ms/Byte
Memory type	FRAM
Installation guidelines	
Minimum distances when mounting in metal (around the data carrier)	–
General data	
Colour	black
Ambient temperature	-40…+210 °C (time-dependent)

Table 10: TW-R50-HT-K2

Type Ident-No.	**TW-R50-HT-K2** 1542329
Storage temperature	-20…+85 °C
Degree of protection (IEC 60529/EN 60529)	IP68
Housing material	PA66

Technical data TW-R16-B128

Figure 11
TW-R16-B128

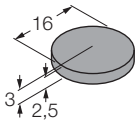


Table 11:
TW-R16-B128

Type Ident-No.	**TW-R16-B128** 6900501
Memory data	
Operating frequency	13.56 MHz
Memory size	128 Bytes
Number of read operations	unlimited
Number of write operations	10^5
Read time (typical)	0.5…5 ms/Byte
Write time (typical)	3…6 ms/Byte
Memory type	EEPROM
Installation guidelines	
Minimum distances when mounting in metal (around the data carrier)	10 mm
General data	
Colour	black
Ambient temperature	-25…+120 °C

Table 11: TW-R16-B128

Type Ident-No.	**TW-R16-B128** 6900501
Storage temperature	-40…+85 °C
Degree of protection (IEC 60529/EN 60529)	IP68
Housing material	Epoxy, plastic-moulded

Technical data TW-R20-B128

Figure 12
TW-R20-B128

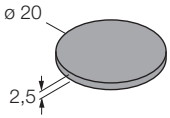


Table 12:
TW-R20-B128

Type Ident-No.	**TW-R20-B128** 6900502
Memory data	
Operating frequency	13.56 MHz
Memory size	128 Bytes
Number of read operations	unlimited
Number of write operations	10^5
Read time (typical)	0.5…5 ms/Byte
Write time (typical)	3…6 ms/Byte
Memory type	EEPROM
Installation guidelines	
Minimum distances when mounting in metal (around the data carrier)	10 mm
General data	
Colour	black
Ambient temperature	-25…+120 °C

Table 12: TW-R20-B128

Type Ident-No.	**TW-R20-B128** 6900502
Storage temperature	-40…+85 °C
Degree of protection (IEC 60529/EN 60529)	IP68
Housing material	PA6

Technical data TW-R30-B128

Figure 13
TW-R30-B128

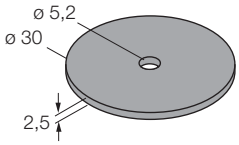


Table 13:
TW-R30-B128

Type	**TW-R30-B128**
Ident-No.	6900503
Memory data	
Operating frequency	13.56 MHz
Memory size	128 Bytes
Number of read operations	unlimited
Number of write operations	10^5
Read time (typical)	0.5…5 ms/Byte
Write time (typical)	3…6 ms/Byte
Memory type	EEPROM
Installation guidelines	
Minimum distances when mounting in metal (around the data carrier)	10 mm
General data	
Colour	black
Ambient temperature	-25…+120 °C

Table 13: TW-R30-B128

Type Ident-No.	**TW-R30-B128** 6900503
Storage temperature	-40…+85 °C
Degree of protection (IEC 60529/EN 60529)	IP68
Housing material	PA6

Technical data TW-R50-B128

Figure 14
TW-R50-B128

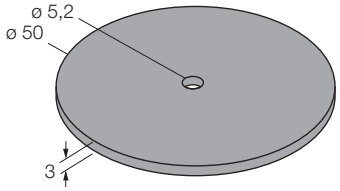


Table 14:
TW-R50-B128

Type	**TW-R50-B128**
Ident-No.	6900504
Memory data	
Operating frequency	13.56 MHz
Memory size	128 Bytes
Number of read operations	unlimited
Number of write operations	10^5
Read time (typical)	0.5…5 ms/Byte
Write time (typical)	3…6 ms/Byte
Memory type	EEPROM
Installation guidelines	
Minimum distances when mounting in metal (around the data carrier)	10 mm
General data	
Colour	black
Ambient temperature	-25…+120 °C

Table 14: TW-R50-B128

Type Ident-No.	**TW-R50-B128** 6900504
Storage temperature	-40…+85 °C
Degree of protection (IEC 60529/EN 60529)	IP68
Housing material	PA6

Technical data TW-R20-K2

Figure 15
TW-R20-K2

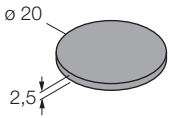


Table 15:
TW-R20-K2

Type	**TW-R20-K2**
Ident-No.	6900505
Memory data	
Operating frequency	13.56 MHz
Memory size	2 KBytes
Number of read operations	unlimited
Number of write operations	10^{10}
Read time (typical)	0.5…5 ms/Byte
Write time (typical)	0.5…5 ms/Byte
Memory type	FRAM
Installation guidelines	
Minimum distances when mounting in metal (around the data carrier)	10 mm
General data	
Colour	black
Ambient temperature	-20…+85 °C

Table 15: TW-R20-K2

Type Ident-No.	**TW-R20-K2** 6900505
Storage temperature	-40…+85 °C
Degree of protection (IEC 60529/EN 60529)	IP68
Housing material	PA6

Technical data TW-R30-K2

Figure 16
TW-R30-K2

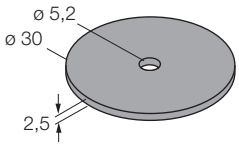


Table 16:
TW-R30-K2

Type	**TW-R30-K2**
Ident-No.	6900506
Memory data	
Operating frequency	13.56 MHz
Memory size	2 KBytes
Number of read operations	unlimited
Number of write operations	10^{10}
Read time (typical)	0.5…5 ms/Byte
Write time (typical)	0.5…5 ms/Byte
Memory type	FRAM
Installation guidelines	
Minimum distances when mounting in metal (around the data carrier)	10 mm
General data	
Colour	black
Ambient temperature	-20…+85 °C

Table 16: TW-R30-K2

Type Ident-No.	**TW-R30-K2** 6900506
Storage temperature	-40…+85 °C
Degree of protection (IEC 60529/EN 60529)	IP68
Housing material	PA6

Technical data TW-R50-K2

Figure 17
TW-R50-K2

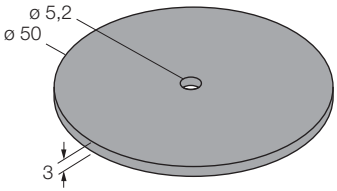


Table 17:
TW-R50-K2

Type	**TW-R50-K2**
Ident-No.	6900507
Memory data	
Operating frequency	13.56 MHz
Memory size	2 KBytes
Number of read operations	unlimited
Number of write operations	10^{10}
Read time (typical)	0.5…5 ms/Byte
Write time (typical)	0.5…5 ms/Byte
Memory type	FRAM
Installation guidelines	
Minimum distances when mounting in metal (around the data carrier)	10 mm
General data	
Colour	black
Ambient temperature	-20…+85 °C

Table 17: TW-R50-K2

Type Ident-No.	**TW-R50-K2** 6900507
Storage temperature	-40…+85 °C
Degree of protection (IEC 60529/EN 60529)	IP68
Housing material	PA6

6 Description of the read-write heads

Type overview 2

Function principle....3
Read-write head electronics 3
Read-write head antenna 4

Technical data of the read-write heads
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TB-M30-H1147....7
TN-M30-H1147 8
TN-CK40-H1147....9
TN-Q80-H1147....10
TN-S32XL-H1147 11

Connection of the read-write heads 12

Type overview

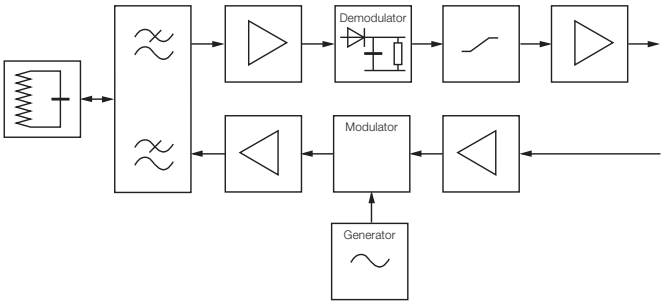
Table 1: Type overview read-write heads

Type	Installation conditions	Output function	Connection
TB-M18-H1147	flush	Read/write	via *BLident* cable
TN-M18-H1147	non-flush	Read/write	via *BLident* cable
TB-M30-H1147	flush	Read/write	via *BLident* cable
TN-M30-H1147	non-flush	Read/write	via *BLident* cable
TN-CK40-H1147	non-flush, (flush instalation possible)	Read/write	via *BLident* cable
TN-Q80-H1147	non-flush, (installation on metal possible)	Read/write	via *BLident* cable
TN-S32XL-H1147	non-flush (installation on metal possible)	Read/write	via *BLident* cable

Function principle

The *BLident* read-write heads (transceivers) are used for non-contact data exchange with the corresponding data carriers (TAGs). They form the so-called air-interface (transfer window), whose size varies depending on the combination of data carrier and transceiver. In this air-interface the data carrier is supplied with energy and the exchange of data is also implemented. The operating frequency is 13.56 MHz.
The achievable distances vary depending on the sizes from 15…200 mm. The read-write heads consist of electronics and an antenna. (Figure 1)

Figure 1
Block diagram
Read-write head

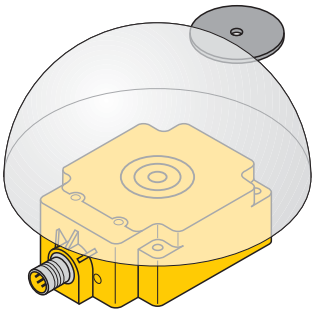


Read-write head electronics

The electronics ensure the communication between the data carrier, the read-write head and the *BLident* interface module.

Read-write head antenna
The antenna consists of an air coil. It is used to transfer data and energy between the data carrier and the read-write head. The antenna generates an electromagnetic field which is detected by the data carrier within the transfer zone. A data and energy transfer is only possible as long as the data carrier is located in this field (Figure 2).

Figure 2
Transfer zone



Technical data TB-M18-H1147

Figure 3
TB-M18-H1147

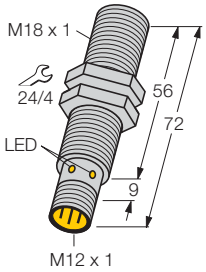


Table 2:
TB-M18-H1147

Type Ident-No.	**TB-M18-H1147** 7030001
Mounting condition	flush
Ambient temperature	-25…+ 70 °C
Data transfer	inductive
Output function	Read/write
Operating frequency	13.56 MHz
Housing style	Threaded barrel, M18 × 1
Housing material	Metal, CuZn, chrome-plated
Active face material	Plastic, PA12-GF30
Connection	Connector, M12 × 1
Vibration resistance	55 Hz (1 mm)
Shock resistance	30 g (11 ms)
Degree of protection	IP67
Power ON indication	Green LED
Function display	Green LED, flashing

Technical data TN-M18-H1147

Figure 4
TN-M18-H1147

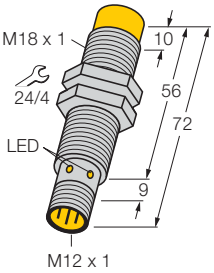


Table 3:
TN-M18-H1147

Type Ident-No.	**TN-M18-H1147** 7030002
Mounting condition	non-flush
Ambient temperature	-25…+ 70 °C
Data transfer	inductive
Output function	Read/write
Operating frequency	13.56 MHz
Housing style	Threaded barrel, M18 × 1
Housing material	Metal, CuZn, chrome-plated
Active face material	Plastic, PA12-GF30
Connection	Connector, M12 × 1
Vibration resistance	55 Hz (1 mm)
Shock resistance	30 g (11 ms)
Degree of protection	IP67
Power ON indication	Green LED
Function display	Green LED, flashing

Technical data TB-M30-H1147

Figure 5
TB-M30-H1147

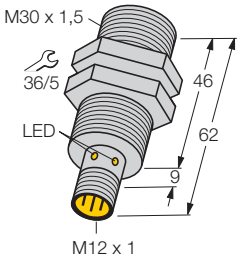


Table 4:
TB-M30-H1147

Type Ident-No.	**TB-M30-H1147** 7030003
Mounting condition	flush
Ambient temperature	-25…+ 70 °C
Data transfer	inductive
Output function	Read/write
Operating frequency	13.56 MHz
Housing style	Threaded barrel, M30 × 1.5
Housing material	Metal, CuZn, chrome-plated
Active face material	Plastic, PA12-GF30
Connection	Connector, M12 × 1
Vibration resistance	55 Hz (1 mm)
Shock resistance	30 g (11 ms)
Degree of protection	IP67
Power ON indication	Green LED
Function display	Green LED, flashing

Technical data TN-M30-H1147

Figure 6
TN-M30-H1147

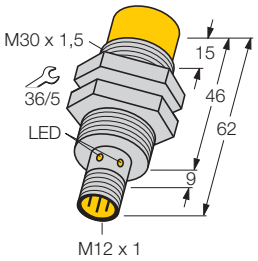


Table 5:
TN-M30-H1147

Type Ident-No.	**TN-M30-H1147** 7030004
Mounting condition	non-flush
Ambient temperature	-25…+ 70 °C
Data transfer	inductive
Output function	Read/write
Operating frequency	13.56 MHz
Housing style	Threaded barrel, M30 × 1.5
Housing material	Metal, CuZn, chrome-plated
Active face material	Plastic, PA12-GF30
Connection	Connector, M12 × 1
Vibration resistance	55 Hz (1 mm)
Shock resistance	30 g (11 ms)
Degree of protection	IP67
Power ON indication	Green LED
Function display	Green LED, flashing

Technical data TN-CK40-H1147

Figure 7
TN-CK40-H1147

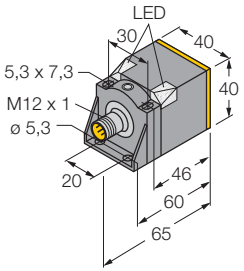


Table 6:
TN-CK40-H1147

Type Ident-No.	**TN-CK40-H1147** 7030006
Mounting condition	non-flush, flush installation
Ambient temperature	-25…+ 70 °C
Data transfer	inductive
Output function	Read/write
Operating frequency	13.56 MHz
Housing style	Rectangular, CK40
Housing material	Plastic, PBT-GF30-V0, black
Active face material	Plastic, PBT-GF30-V0, yellow
Connection	Connector, M12 × 1
Vibration resistance	55 Hz (1 mm)
Shock resistance	30 g (11 ms)
Degree of protection	IP67
Power ON indication	Green LED
Function display	Green LED, flashing

Technical data TN-Q80-H1147

Figure 8
TN-Q80-H1147

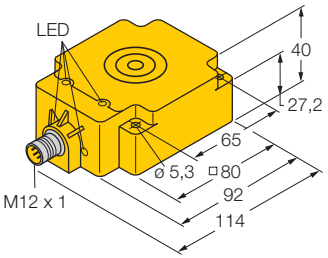


Table 7:
TN-Q80-H1147

Type Ident-No.	**TN-Q80-H1147** 7030007
Mounting condition	non-flush, installation on metal possible
Ambient temperature	-25…+ 70 °C
Data transfer	inductive
Output function	Read/write
Operating frequency	13.56 MHz
Housing style	Q80
Housing material	Plastic, PBT-GF30-V0, yellow
Active face material	Plastic, PBT-GF30-V0, yellow
Connection	Connector, M12 × 1
Vibration resistance	55 Hz (1 mm)
Shock resistance	30 g (11 ms)
Degree of protection	IP67
Power ON indication	Green LED
Function display	Green LED, flashing

Technical data TN-S32XL-H1147

Figure 9
TN-S32XL-H1147

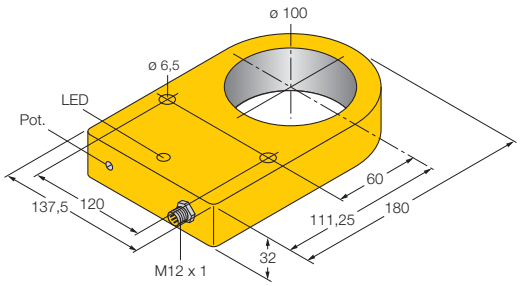


Table 8:
TN-S32XL-H1147

Type	**TN-S32XL-H1147**
Ident-No.	7030008
Mounting condition	non-flush, installation on metal possible
Ambient temperature	-25…+ 70 °C
Data transfer	inductive
Output function	Read/write
Operating frequency	13.56 MHz
Housing style	Ring sensor, S32
Housing material	Plastic, ABS, yellow
Ring internal diameter	100 mm
Connection	Connector, M12 × 1
Vibration resistance	55 Hz (1 mm)
Shock resistance	30 g (11 ms)
Degree of protection	IP67
Power ON indication	Green LED
Function display	Green LED, flashing

Description of the read-write heads

The read-write heads are connected via an M12 × 1 connector with the *BLident* interface module. The power supply (24 V DC) and function are implemented via the *BLident* interface module.

Figure 10
Wiring diagram

7 Description of the read-write heads with corresponding data carriers

Notes for the operating data 5

Operating data
- TB-M18-H1147 with data carrier TW-R16-B128 6
- TB-M18-H1147 with data carrier TW-R20-B128 6
- TB-M18-H1147 with data carrier TW-R30-B128 6
- TB-M18-H1147 with data carrier TW-R20-K2 6
- TB-M18-H1147 with data carrier TW-R16-HT-B128 6
- TB-M18-H1147 with data carrier TW-R20-HT-B128 6
- TB-M18-H1147 with data carrier TW-R22-HT-B64 6
- TB-M18-H1147 with data carrier TW-R22-HT-B128 6
- TN-M18-H1147 with data carrier TW-R16-B128 7
- TN-M18-H1147 with data carrier TW-R20-B128 7
- TN-M18-H1147 with data carrier TW-R30-B128 7
- TN-M18-H1147 with data carrier TW-R50-B128 7
- TN-M18-H1147 with data carrier TW-R20-K2 7
- TN-M18-H1147 with data carrier TW-R30-K2 7
- TN-M18-H1147 with data carrier TW-R50-K2 7
- TN-M18-H1147 with data carrier TW-R16-HT-B128 7
- TN-M18-H1147 with data carrier TW-R20-HT-B128 7
- TN-M18-H1147 with data carrier TW-R22-HT-B64 7
- TN-M18-H1147 with data carrier TW-R22-HT-B128 7
- TN-M18-H1147 with data carrier TW-R30-HT-B128 7
- TN-M18-H1147 with data carrier TW-R50-HT-B128 7
- TN-M18-H1147 with data carrier TW-R20-HT-K2 7
- TN-M18-H1147 with data carrier TW-R30-HT-K2 7
- TN-M18-H1147 with data carrier TW-R50-HT-K2 7
- TB-M30-H1147 with data carrier TW-R16-B128 8
- TB-M30-H1147 with data carrier TW-R20-B128 8
- TB-M30-H1147 with data carrier TW-R30-B128 8
- TB-M30-H1147 with data carrier TW-R50-B128 8
- TB-M30-H1147 with data carrier TW-R20-K2 8
- TB-M30-H1147 with data carrier TW-R30-K2 8
- TB-M30-H1147 with data carrier TW-R50-K2 8
- TB-M30-H1147 with data carrier TW-R16-HT-B128 8
- TB-M30-H1147 with data carrier TW-R20-HT-B128 8
- TB-M30-H1147 with data carrier TW-R22-HT-B64 8
- TB-M30-H1147 with data carrier TW-R22-HT-B128 8
- TB-M30-H1147 with data carrier TW-R30-HT-B128 8
- TB-M30-H1147 with data carrier TW-R50-HT-B128 8
- TB-M30-H1147 with data carrier TW-R20-HT-K2 8

TB-M30-H1147 with data carrier TW-R30-HT-K2 8
TB-M30-H1147 with data carrier TW-R50-HT-K2 8
TN-M30-H1147 with data carrier TW-R16-B128 9
TN-M30-H1147 with data carrier TW-R20-B128 9
TN-M30-H1147 with data carrier TW-R30-B128 9
TN-M30-H1147 with data carrier TW-R50-B128 9
TN-M30-H1147 with data carrier TW-R20-K2 9
TN-M30-H1147 with data carrier TW-R30-K2 9
TN-M30-H1147 with data carrier TW-R50-K2 9
TN-M30-H1147 with data carrier TW-R16-HT-B128 9
TN-M30-H1147 with data carrier TW-R20-HT-B128 9
TN-M30-H1147 with data carrier TW-R22-HT-B64 9
TN-M30-H1147 with data carrier TW-R22-HT-B128 9
TN-M30-H1147 with data carrier TW-R30-HT-B128 9
TN-M30-H1147 with data carrier TW-R50-HT-B128 9
TN-M30-H1147 with data carrier TW-R20-HT-K2 9
TN-M30-H1147 with data carrier TW-R30-HT-K2 9
TN-M30-H1147 with data carrier TW-R50-HT-K2 9
TN-CK40-H1147 with data carrier TW-R16-B128 10
TN-CK40-H1147 with data carrier TW-R20-B128 10
TN-CK40-H1147 with data carrier TW-R30-B128 10
TN-CK40-H1147 with data carrier TW-R50-B128 10
TN-CK40-H1147 with data carrier TW-R20-K2.....10
TN-CK40-H1147 with data carrier TW-R30-K2.....10
TN-CK40-H1147 with data carrier TW-R50-K2.....10
TN-CK40-H1147 with data carrier TW-R16-HT-B128 10
TN-CK40-H1147 with data carrier TW-R20-HT-B128 10
TN-CK40-H1147 with data carrier TW-R22-HT-B64 10
TN-CK40-H1147 with data carrier TW-R22-HT-B128 10
TN-CK40-H1147 with data carrier TW-R30-HT-B128 10
TN-CK40-H1147 with data carrier TW-R50-HT-B128 10
TN-CK40-H1147 with data carrier TW-R20-HT-K2 10
TN-CK40-H1147 with data carrier TW-R30-HT-K2 10
TN-CK40-H1147 with data carrier TW-R50-HT-K2 10
TN-Q80-H1147 with data carrier TW-R16-B128.....11
TN-Q80-H1147 with data carrier TW-R20-B128.....11
TN-Q80-H1147 with data carrier TW-R30-B128.....11
TN-Q80-H1147 with data carrier TW-R50-B128.....11
TN-Q80-H1147 with data carrier TW-R20-K2.....11
TN-Q80-H1147 with data carrier TW-R30-K2.....11
TN-Q80-H1147 with data carrier TW-R50-K2.....11
TN-Q80-H1147 with data carrier TW-R16-HT-B128.....11
TN-Q80-H1147 with data carrier TW-R20-HT-B128.....11

TN-Q80-H1147 with data carrier TW-R22-HT-B64 11
TN-Q80-H1147 with data carrier TW-R22-HT-B128 11
TN-Q80-H1147 with data carrier TW-R30-HT-B128 11
TN-Q80-H1147 with data carrier TW-R50-HT-B128 11
TN-Q80-H1147 with data carrier TW-R20-HT-K2 11
TN-Q80-H1147 with data carrier TW-R30-HT-K2 11
TN-Q80-H1147 with data carrier TW-R50-HT-K2 11
TN-S32XL-H1147 with data carrier TW-R16-B128 12
TN-S32XL-H1147 with data carrier TW-R20-B128 12
TN-S32XL-H1147 with data carrier TW-R30-B128 12
TN-S32XL-H1147 with data carrier TW-R50-B128 12
TN-S32XL-H1147 with data carrier TW-R20-K2 12
TN-S32XL-H1147 with data carrier TW-R30-K2 12
TN-S32XL-H1147 with data carrier TW-R50-K2 12
TN-S32XL-H1147 with data carrier TW-R16-HT-B128 12
TN-S32XL-H1147 with data carrier TW-R20-HT-B128 12
TN-S32XL-H1147 with data carrier TW-R22-HT-B64 12
TN-S32XL-H1147 with data carrier TW-R22-HT-B128 12
TN-S32XL-H1147 with data carrier TW-R30-HT-B128 12
TN-S32XL-H1147 with data carrier TW-R50-HT-B128 12
TN-S32XL-H1147 with data carrier TW-R20-HT-K2 12
TN-S32XL-H1147 with data carrier TW-R30-HT-K2 12
TN-S32XL-H1147 with data carrier TW-R50-HT-K2 12

Notes for the operating data

The operating data are sufficient for the fundamental specification of a system. They provide a simplified analysis of the overtravel distances which can be found in chapter 8.

If a more detailed examination of the performance of read-write heads is necessary, the corresponding overtravel distances can be consulted.

Note

Remember that the auxiliary factors, e.g. the influence of metals, are not considered for the sake of simplification.

Corresponding tests should be undertaken before commissioning.

Operating data for read-write head TB-M18-H1147

Table 1: Operating data TB-M18-H1147

Corresponding data carrier	Read-write distance		
	Recommended [mm]	Minimum [mm]	Maximum [mm]
TW-R16-B128	6	–	13
TW-R20-B128	6	–	13
TW-R30-B128	7	–	15
TW-R20-K2	5	–	12
TW-R16-HT-B128	–	–	3
TW-R20-HT-B128	–	–	3
TW-R22-HT-B64	2	–	3
TW-R22-HT-B128	2	–	3

Operating data for read-write head TN-M18-H1147

Table 2: Operating data TN-M18-H1147

Corresponding data carrier	Read-write distance		
	Recommended [mm]	Minimum [mm]	Maximum [mm]
TW-R16-B128	12	–	23
TW-R20-B128	10	–	22
TW-R30-B128	13	–	25
TW-R50-B128	20	–	41
TW-R20-K2	12	–	20
TW-R30-K2	16	–	31
TW-R50-K2	12	–	30
TW-R16-HT-B128	2	–	13
TW-R20-HT-B128	–	–	12
TW-R22-HT-B64	2	–	3
TW-R22-HT-B128	2	–	3
TW-R30-HT-B128	–	–	15
TW-R50-HT-B128	10	–	31
TW-R20-HT-K2	2	–	10
TW-R30-HT-K2	6	–	21
TW-R50-HT-K2	2	–	20

Operating data for read-write head TB-M30-H1147

Table 3: Operating data TB-M30-H1147

Corresponding data carrier	Read-write distance		
	Recommended [mm]	Minimum [mm]	Maximum [mm]
TW-R16-B128	12	–	23
TW-R20-B128	15	–	27
TW-R30-B128	13	–	30
TW-R50-B128	20	–	43
TW-R20-K2	15	–	22
TW-R30-K2	15	–	27
TW-R50-K2	15	–	33
TW-R16-HT-B128	2	–	13
TW-R20-HT-B128	5	–	17
TW-R22-HT-B64	5	–	17
TW-R22-HT-B128	5	–	17
TW-R30-HT-B128	3	–	20
TW-R50-HT-B128	10	–	33
TW-R20-HT-K2	5	–	12
TW-R30-HT-K2	5	–	17
TW-R50-HT-K2	5	–	23

Operating data for read-write head TN-M30-H1147

Table 4: Operating data TN-M30-H1147

Corresponding data carrier	Read-write distance		
	Recommended [mm]	Minimum [mm]	Maximum [mm]
TW-R16-B128	20	–	38
TW-R20-B128	22	–	40
TW-R30-B128	22	–	43
TW-R50-B128	40	–	72
TW-R20-K2	17	–	31
TW-R30-K2	23	–	42
TW-R50-K2	30	–	58
TW-R16-HT-B128	10	–	28
TW-R20-HT-B128	12	–	30
TW-R22-HT-B64	12	–	30
TW-R22-HT-B128	12	–	30
TW-R30-HT-B128	12	–	33
TW-R50-HT-B128	30	–	62
TW-R20-HT-K2	7	–	21
TW-R30-HT-K2	13	–	32
TW-R50-HT-K2	20	–	48

Operating data for read-write head TN-CK40-H1147

Table 5: Operating data TN-CK40-H1147

Corresponding data carrier	Read-write distance		
	Recommended [mm]	Minimum [mm]	Maximum [mm]
TW-R16-B128	28	–	50
TW-R20-B128	30	–	50
TW-R30-B128	30	–	53
TW-R50-B128	45	–	85
TW-R20-K2	22	–	40
TW-R30-K2	30	–	55
TW-R50-K2	38	–	81
TW-R16-HT-B128	18	–	40
TW-R20-HT-B128	20	–	40
TW-R22-HT-B64	20	–	40
TW-R22-HT-B128	20	–	40
TW-R30-HT-B128	20	–	43
TW-R50-HT-B128	35	–	75
TW-R20-HT-K2	12	–	30
TW-R30-HT-K2	20	–	45
TW-R50-HT-K2	28	–	71

Operating data for read-write head TN-Q80-H1147

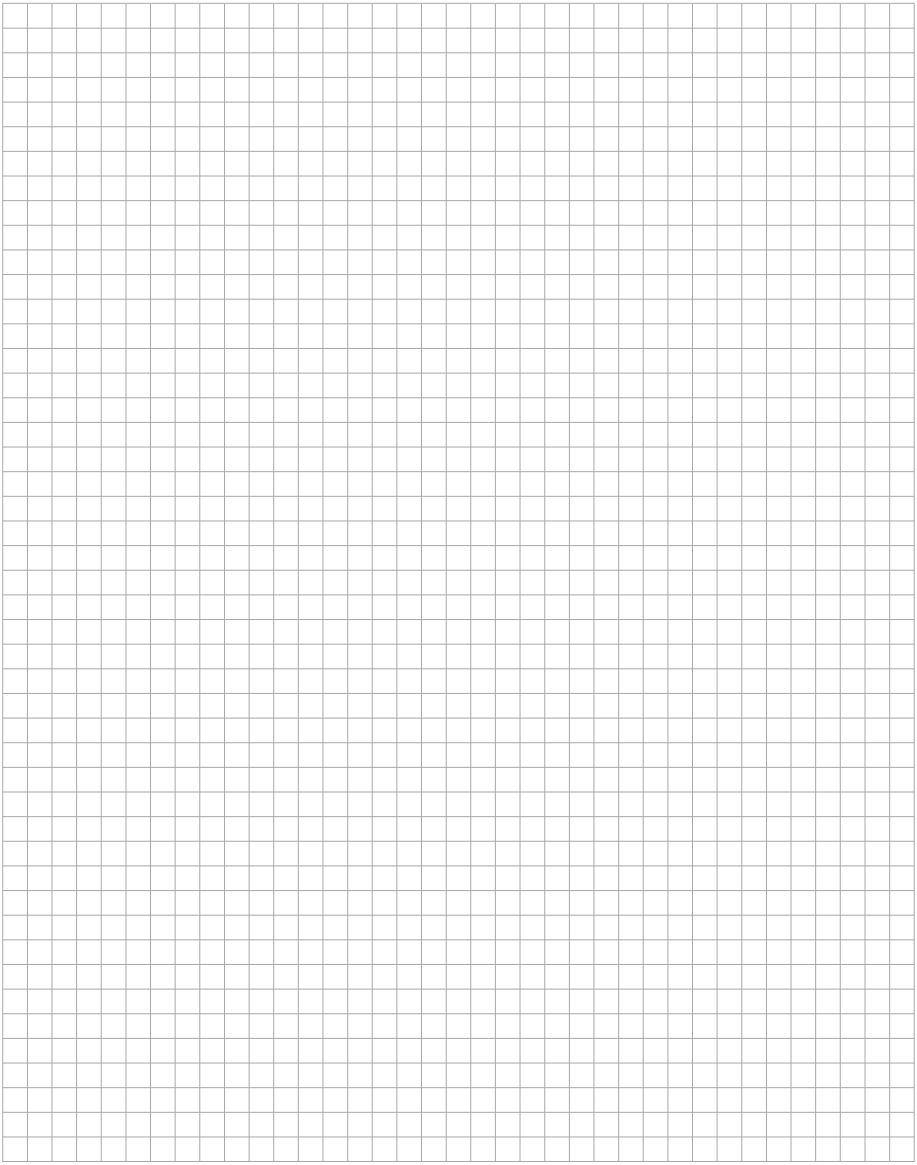
Table 6: Operating data TN-Q80-H1147

Corresponding data carrier	Read-write distance		
	Recommended [mm]	Minimum [mm]	Maximum [mm]
TW-R16-B128	20	–	52
TW-R20-B128	35	–	65
TW-R30-B128	35	–	72
TW-R50-B128	65	–	118
TW-R20-K2	25	–	52
TW-R30-K2	35	–	67
TW-R50-K2	50	–	100
TW-R16-HT-B128	10	–	42
TW-R20-HT-B128	25	–	55
TW-R22-HT-B64	25	–	55
TW-R22-HT-B128	25	–	55
TW-R30-HT-B128	25	–	62
TW-R50-HT-B128	55	–	108
TW-R20-HT-K2	15	–	42
TW-R30-HT-K2	25	–	57
TW-R50-HT-K2	40	–	90

Operating data for read-write head TN-S32XL-H1147

Table 7: Operating data TN-S32XL-H1147

Corresponding data carrier	Read-write distance		
	Recommended [mm]	Minimum [mm]	Maximum [mm]
TW-R16-B128	20	–	67
TW-R20-B128	25	–	72
TW-R30-B128	30	–	80
TW-R50-B128	80	–	150
TW-R20-K2	20	–	60
TW-R30-K2	30	–	78
TW-R50-K2	60	–	128
TW-R16-HT-B128	10	–	57
TW-R20-HT-B128	15	–	62
TW-R22-HT-B64	15	–	62
TW-R22-HT-B128	15	–	62
TW-R30-HT-B128	20	–	70
TW-R50-HT-B128	70	–	140
TW-R20-HT-K2	10	–	50
TW-R30-HT-K2	20	–	68
TW-R50-HT-K2	50	–	118



8 Description of the read-write heads with corresponding data carriers

Notes for the overtravel distances 3

Overtravel distance read-write head – housing style M18
- TN-M18-H1147 with data carrier TW-R16-…B128 4
- TB-M18-H1147 with data carrier TW-R16-…B128 4
- TN-M18-H1147 with data carrier TW-R20-…B128 5
- TB-M18-H1147 with data carrier TW-R20-…B128 5
- TN-M18-H1147 with data carrier TW-R30-…B128 6
- TB-M18-H1147 with data carrier TW-R30-…B128 6
- TN-M18-H1147 with data carrier TW-R50-…B128 7
- TN-M18-H1147 with data carrier TW-R20-…K2 7
- TB-M18-H1147 with data carrier TW-R20-…K2 8
- TN-M18-H1147 with data carrier TW-R30-…K2 8
- TN-M18-H1147 with data carrier TW-R50-…K2 9

Overtravel distance read-write head – housing style M30
- TN-M30-H1147 with data carrier TW-R16-…B128 9
- TB-M30-H1147 with data carrier TW-R16-…B128 10
- TN-M30-H1147 with data carrier TW-R20-…B128 10
- TB-M30-H1147 with data carrier TW-R20-…B128 11
- TN-M30-H1147 with data carrier TW-R30-…B128 11
- TB-M30-H1147 with data carrier TW-R30-…B128 12
- TN-M30-H1147 with data carrier TW-R50-…B128 12
- TB-M30-H1147 with data carrier TW-R50-…B128 13
- TN-M30-H1147 with data carrier TW-R20-…K2 13
- TB-M30-H1147 with data carrier TW-R20-…K2 14
- TN-M30-H1147 with data carrier TW-R30-…K2 14
- TB-M30-H1147 with data carrier TW-R30-…K2 15
- TN-M30-H1147 with data carrier TW-R50-…K2 15
- TB-M30-H1147 with data carrier TW-R50-…K2 16

Overtravel distance read-write head – housing style Q40
- TN-CK40-H1147 with data carrier TW-R16-…B128 16
- TN-CK40-H1147 with data carrier TW-R20-…B128 17
- TN-CK40-H1147 with data carrier TW-R30-…B128 17
- TN-CK40-H1147 with data carrier TW-R50-…B128 18
- TN-CK40-H1147 with data carrier TW-R20-…K2 18
- TN-CK40-H1147 with data carrier TW-R30-…K2 19
- TN-CK40-H1147 with data carrier TW-R50-…K2 19

Overtravel distance read-write head – housing style Q80
TN-Q80-H1147 with data carrier TW-R16-…B128 20
TN-Q80-H1147 with data carrier TW-R20-…B128 20
TN-Q80-H1147 with data carrier TW-R30-…B128 21
TN-Q80-H1147 with data carrier TW-R50-…B128 21
TN-Q80-H1147 with data carrier TW-R20-…K2 22
TN-Q80-H1147 with data carrier TW-R30-…K2 22
TN-Q80-H1147 with data carrier TW-R50-…K2 23

Overtravel distance read-write head – housing style S32
TN-S32XL-H1147 with data carrier TW-R16-…B128 23
TN-S32XL-H1147 with data carrier TW-R30-…B128 24
TN-S32XL-H1147 with data carrier TW-R50-…B128 24
TN-S32XL-H1147 with data carrier TW-R30-…K2 25
TN-S32XL-H1147 with data carrier TW-R50-…K2 25

Notes for the overtravel distances

The following characteristic curves indicate the overtravel distances of the different read-write heads with the data carriers used.

The characteristic curves are not just dependent on the used read-write head and the data carrier, but also on the memory type of the data carrier (EEPROM or FRAM) (see Overview table 1).

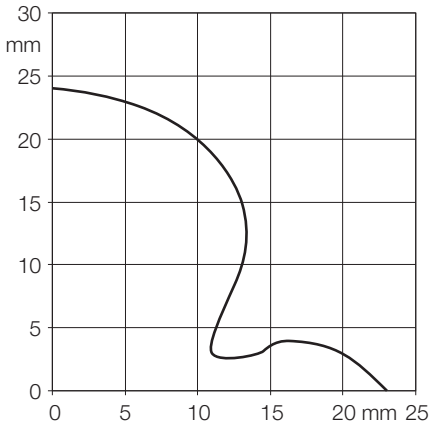
The characteristic curves of the high temperature data carriers are not listed separately. They deviate from those listed on the following pages only in the fact that the curves must simply be offset downwards by 10 mm..

Table 1: Data carrier memory type

Type	High-temperature resistant	Memory size	Memory type
TW-R16-HT-B128	✔	128 Bytes	EEPROM
TW-R20-HT-B128	✔	128 Bytes	EEPROM
TW-R22-HT-B64	✔	64 Bytes	EEPROM
TW-R30-HT-B128	✔	128 Bytes	EEPROM
TW-R50-HT-B128	✔	128 Bytes	EEPROM
TW-R20-HT-K2	✔	2 KBytes	FRAM
TW-R30-HT-K2	✔	2 KBytes	FRAM
TW-R50-HT-K2	✔	2 KBytes	FRAM
TW-R16-B128	–	128 Bytes	EEPROM
TW-R20-B128	–	128 Bytes	EEPROM
TW-R30-B128	–	128 Bytes	EEPROM
TW-R50-B128	–	128 Bytes	EEPROM
TW-R20-K2	–	2 KBytes	FRAM
TW-R30-K2	–	2 KBytes	FRAM
TW-R50-K2	–	2 KBytes	FRAM

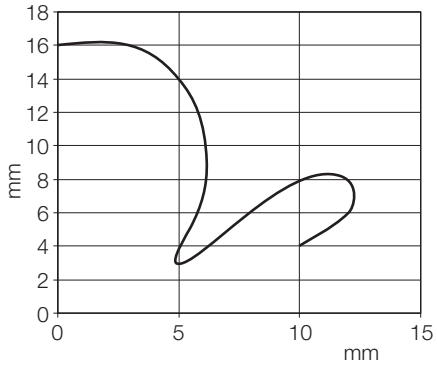
Read-write head TN-M18-H1147 overtravel distance with data carrier TW-R16-…B128.

Figure 1
Overtravel distance TN-M18-H1147 with TW-R16-…B128



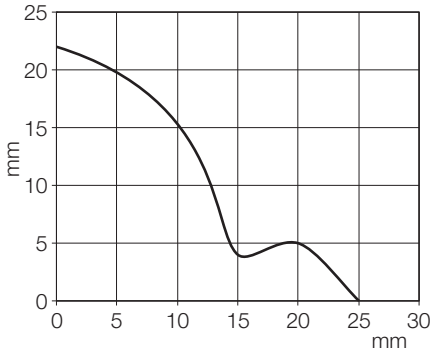
Read-write head TB-M18-H1147 overtravel distance with data carrier TW-R16-…B128.

Figure 2
Overtravel distance TB-M18-H1147 with TW-R16-… B128



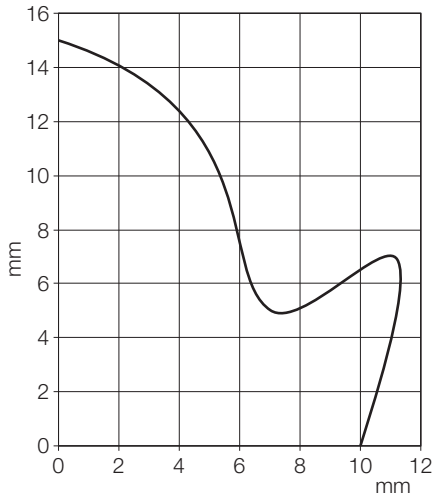
Read-write head TN-M18-H1147 overtravel distance with data carrier TW-R20-…B128.

Figure 3
Overtravel distance TN-M18-H1147 with TW-R20-… B128



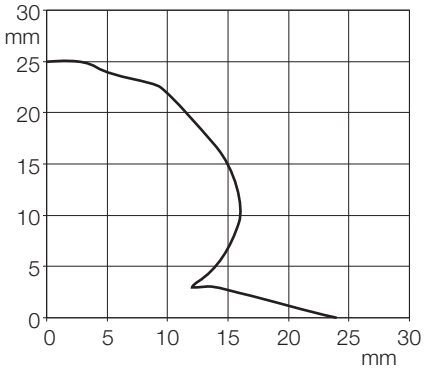
Read-write head TB-M18-H1147 overtravel distance with data carrier TW-R20-…B128.

Figure 4
Overtravel distance TB-M18-H1147 with TW-R20-… B128



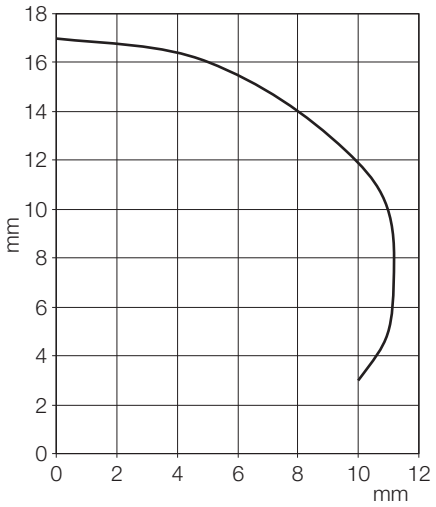
Read-write head TN-M18-H1147 overtravel distance with data carrier TW-R30-…B128.

Figure 5
Overtravel distance TN-M18-H1147 with TW-R30-… B128



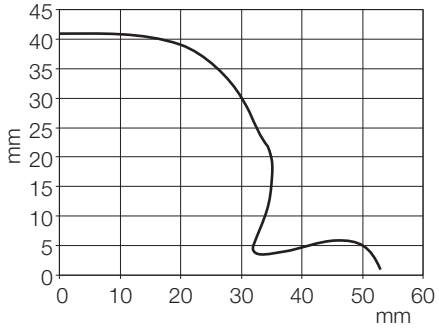
Read-write head TB-M18-H1147 overtravel distance with data carrier TW-R30-…B128.

Figure 6
Overtravel distance TB-M18-H1147 with TW-R30-… B128



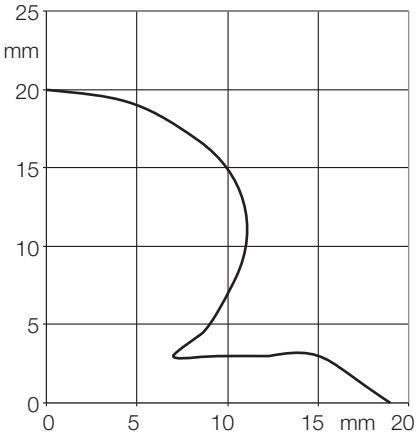
Read-write head TN-M18-H1147 overtravel distance with data carrier TW-R50-…B128.,

Figure 7
Overtravel distance TN-M18-H1147 with TW-R50-…B128



Read-write head TN-M18-H1147 overtravel distance with data carrier TW-R20-…K2,

Figure 8
Overtravel distance TN-M18-H1147 with TW-R20-…K2

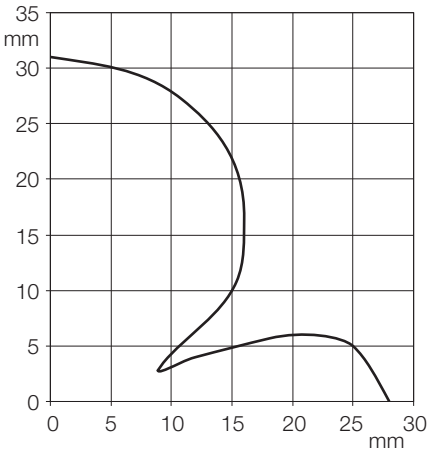


Read-write head TB-M18-H1147 overtravel distance with data carrier TW-R20-…K2,

Figure 9 Overtravel distance TB-M18-H1147 with TW-R20-…K2

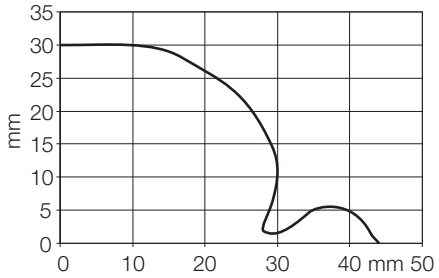
Read-write head TN-M18-H1147 overtravel distance with data carrier TW-R30-…K2

Figure 10 Overtravel distance TN-M18-H1147 with TW-R30-…K2



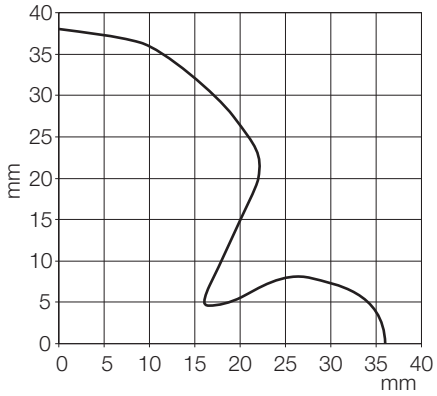
Read-write head TN-M18-H1147 overtravel distance with data carrier TW-R50-…K2

Figure 11
Overtravel distance TN-M18-H1147 with TW-R50-…K2



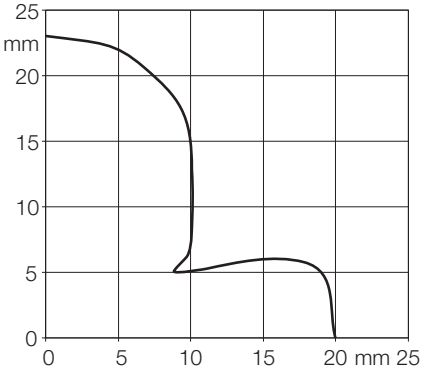
Read-write head TN-M30-H1147 overtravel distance with data carrier TW-R16-…B128.

Figure 12
Overtravel distance TN-M30-H1147 with TW-R16-…B128



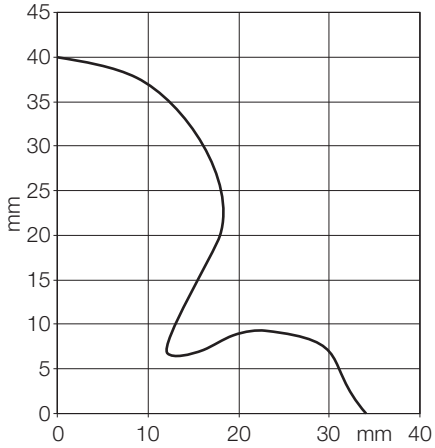
Read-write head TB-M30-H1147 overtravel distance with data carrier TW-R16-…B128.

Figure 13
Overtravel distance TB-M30-H1147 with TW-R16-…B128



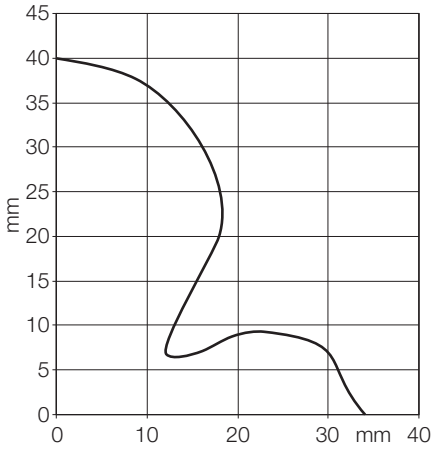
Read-write head TN-M30-H1147 overtravel distance with data carrier TW-R20-…B128.

Figure 14
Overtravel distance TN-M30-H1147 with TW-R20-…B128



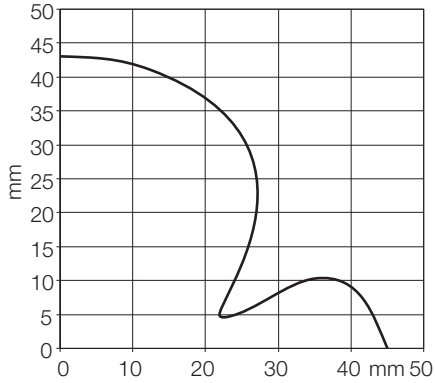
Read-write head TB-M30-H1147 overtravel distance with data carrier TW-R20-…B128.

Figure 15
Overtravel distance TB-M30-H1147 with TW-R20-…B128



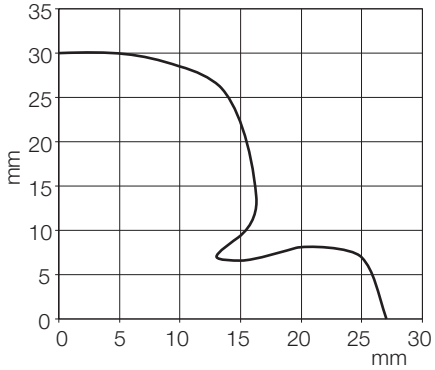
Read-write head TN-M30-H1147 overtravel distance with data carrier TW-R30-…B128.

Figure 16
Overtravel distance TN-M30-H1147 with TW-R30-…B128



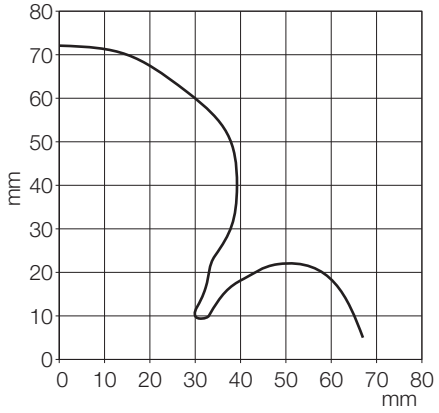
Read-write head TB-M30-H1147 overtravel distance with data carrier TW-R30-…B128.

Figure 17 Overtravel distance TB-M30-H1147 with TW-R30-…B128



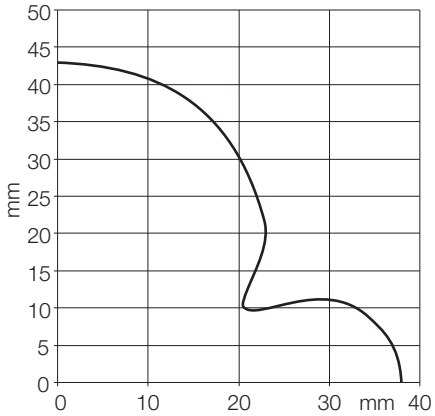
Read-write head TN-M30-H1147 overtravel distance with data carrier TW-R50-…B128.

Figure 18 Overtravel distance TN-M30-H1147 with TW-R50-…B128



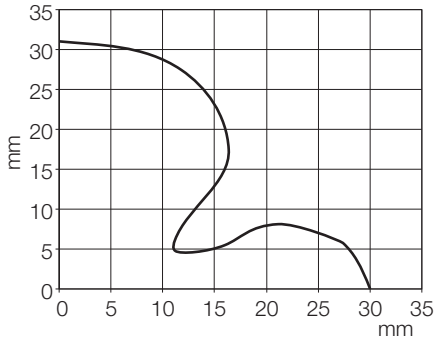
Read-write head TB-M30-H1147 overtravel distance with data carrier TW-R50-...B128

Figure 19
Overtravel distance TB-M30-H1147 with TW-R50-…B128



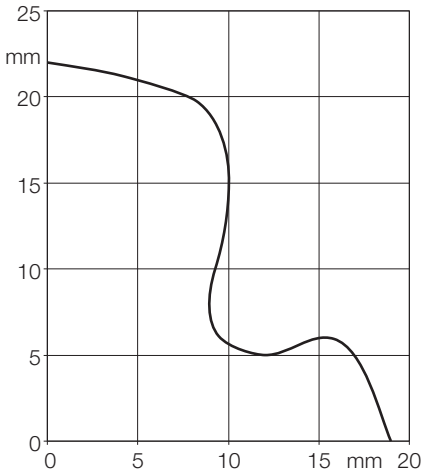
Read-write head TN-M30-H1147 overtravel distance with data carrier TW-R20-...K2

Figure 20
Overtravel distance TN-M30-H1147 with TW-R20-…K2



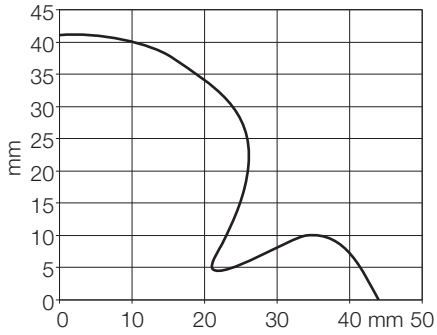
Read-write head TB-M30-H1147 overtravel distance with data carrier TW-R20-

Figure 21
Overtravel distance TB-M30-H1147 with TW-R20-…K2



Read-write head TN-M30-H1147 overtravel distance with data carrier TW-R30-

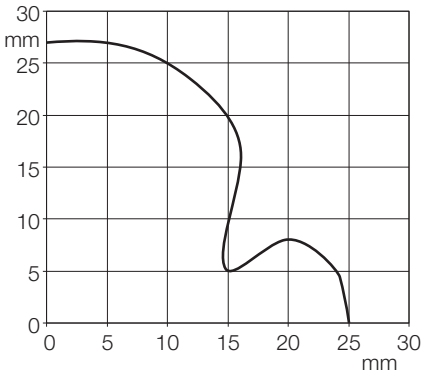
Figure 22
Overtravel distance TN-M30-H1147 with TW-R30-…K2



…K2

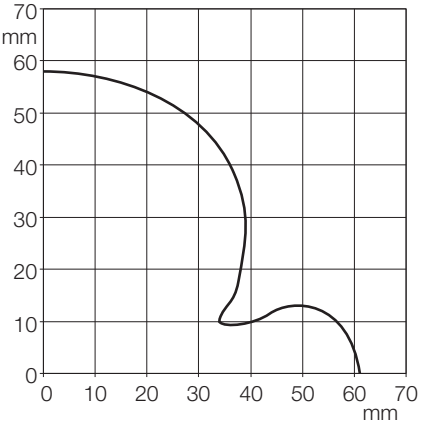
Read-write head TB-M30-H1147 overtravel distance with data carrier TW-R30-…K2

Figure 23
Overtravel distance TB-M30-H1147 with TW-R30-…K2



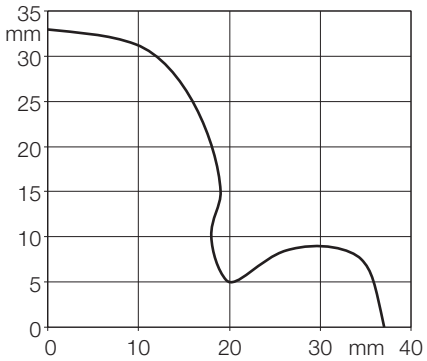
Read-write head TN-M30-H1147 overtravel distance with data carrier TW-R50-…K2

Figure 24
Overtravel distance TN-M30-H1147 with TW-R50-…K2



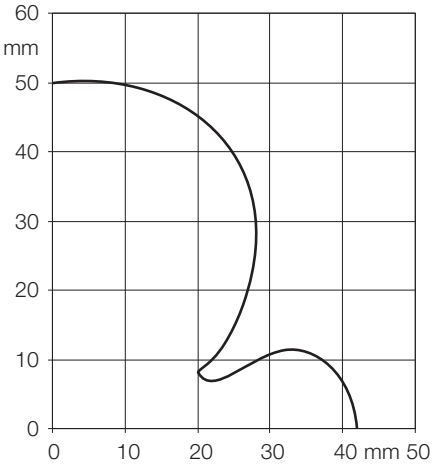
Read-write head TB-M30-H1147 overtravel distance with data carrier TW-R50-…K2

Figure 25 Overtravel distance TB-M30-H1147 with TW-R50-…K2



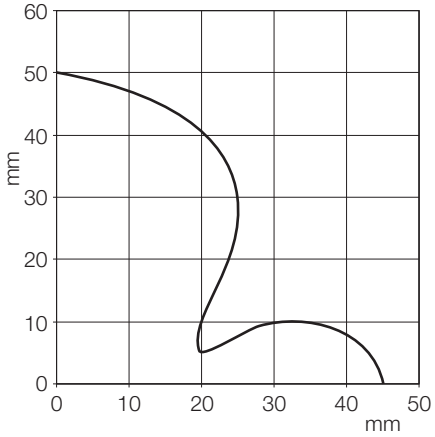
Read-write head TN-CK40-H1147 overtravel distance with data carrier TW-R16-…B128

Figure 26 Overtravel distance TN-CK40-H1147 with TW-R16-…B128



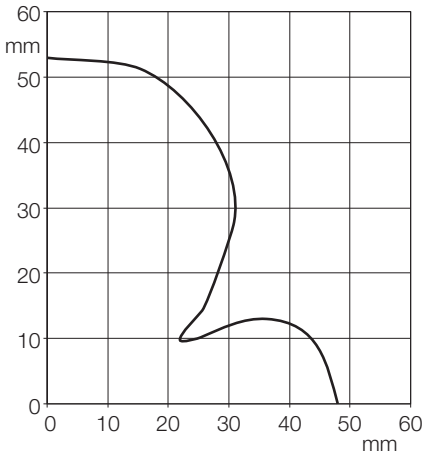
Read-write head TN-CK40-H1147 overtravel distance with data carrier TW-R20-…B128

Figure 27
Overtravel distance TN-CK40-H1147 with TW-R20-…B128



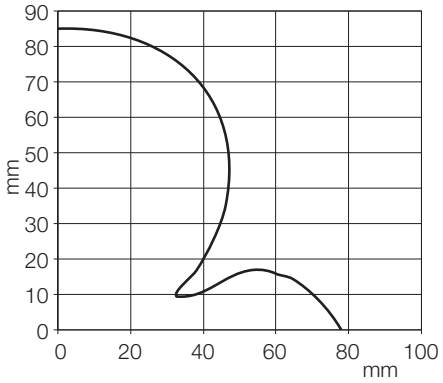
Read-write head TN-CK40-H1147 overtravel distance with data carrier TW-R30-…B128

Figure 28
Overtravel distance TN-CK40-H1147 with TW-R30-…B128



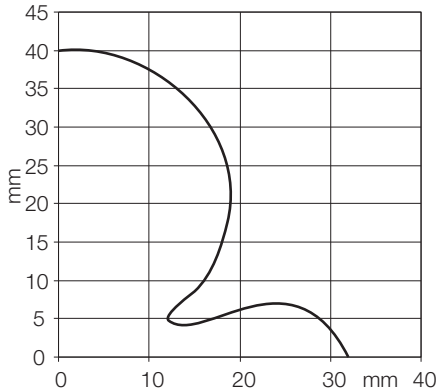
Read-write head TN-CK40-H1147 overtravel distance with data carrier TW-R50-…B128

Figure 29 Overtravel distance TN-CK40-H1147 with TW-R50-…B128



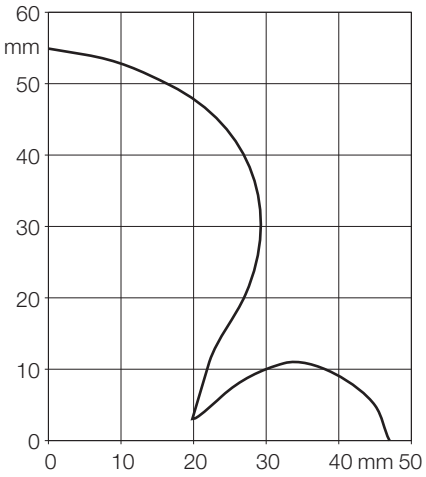
Read-write head TN-CK40-H1147 overtravel distance with data carrier TW-R20-…K2

Figure 30 Overtravel distance TN-CK40-H1147 with TW-R20-…K2



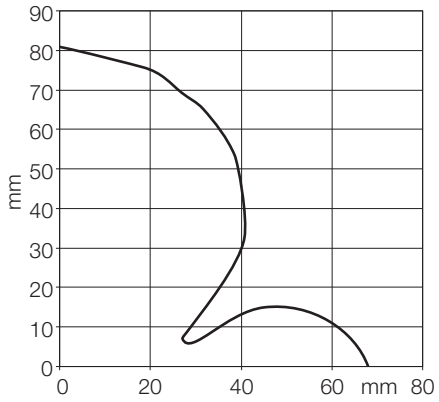
Read-write head TN-CK40-H1147 overtravel distance with data carrier TW-R30-…K2

Figure 31
Overtravel distance TN-CK40-H1147 with TW-R30-…K2



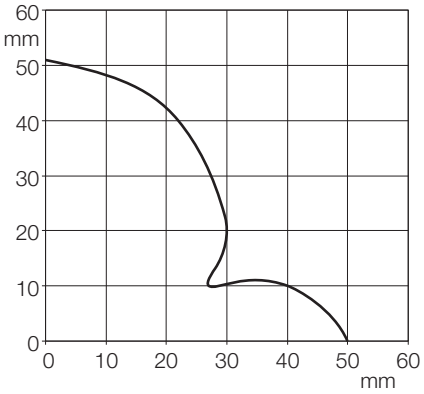
Read-write head TN-CK40-H1147 overtravel distance with data carrier TW-R50-…K2

Figure 32
Overtravel distance TN-CK40-H1147 with TW-R50-…K2



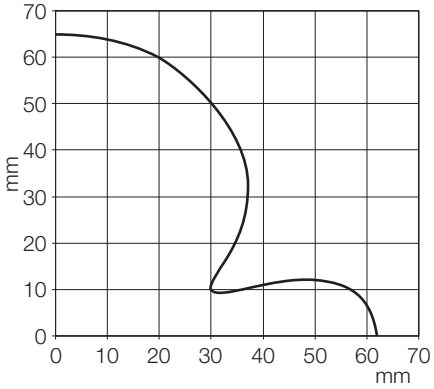
Read-write head TN-Q80-H1147 overtravel distance with data carrier TW-R16-…B128

Figure 33
Overtravel distance TN-Q80-H1147 with TW-R16-…B128



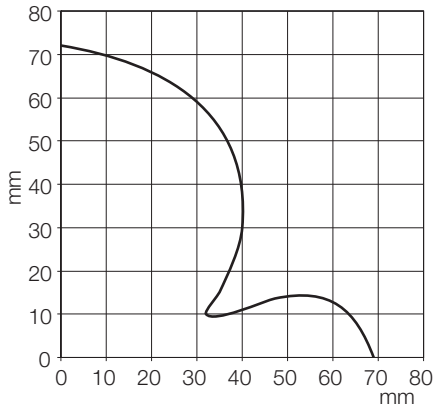
Read-write head TN-Q80-H1147 overtravel distance with data carrier TW-R20-…B128

Figure 34
Overtravel distance TN-Q80-H1147 with TW-R20-…B128



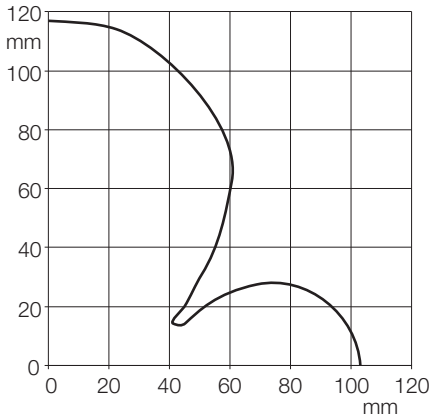
Read-write head TN-Q80-H1147 overtravel distance with data carrier TW-R30-...B128

Figure 35
Overtravel distance TN-Q80-H1147 with TW-R30-…B128



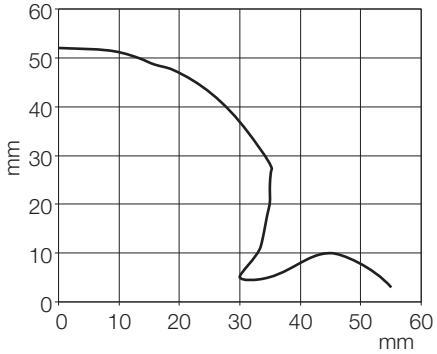
Read-write head TN-Q80-H1147 overtravel distance with data carrier TW-R50-...B128

Figure 36
Overtravel distance TN-Q80-H1147 with TW-R50-…B128



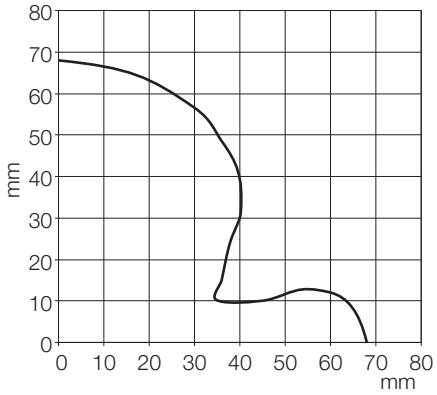
Read-write head TN-Q80-H1147 overtravel distance with data carrier TW-R20-...K2

Figure 37 Overtravel distance TN-Q80-H1147 with TW-R20-…K2



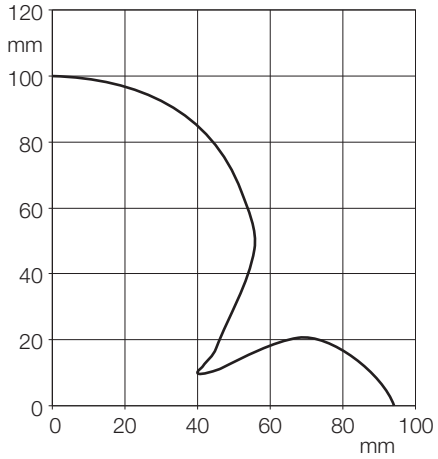
Read-write head TN-Q80-H1147 overtravel distance with data carrier TW-R30-...K2

Figure 38 Overtravel distance TN-Q80-H1147 with TW-R30-…K2



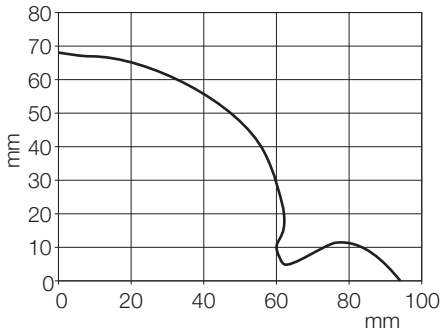
Read-write head TN-Q80-H1147 overtravel distance with data carrier TW-R50-…K2

Figure 39 Overtravel distance TN-Q80-H1147 with TW-R50-…K2



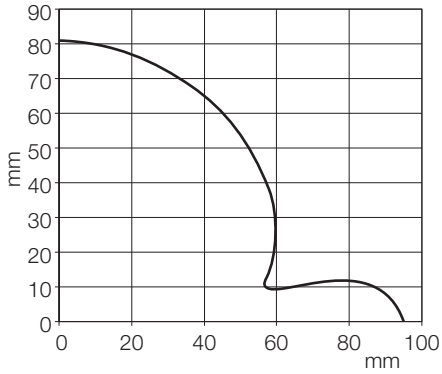
Read-write head TN-S32XL-H1147 overtravel distance with data carrier TW-R16-…B128.

Figure 40 Overtravel distance TN-S32XL-H1147 with TW-R16-…B128



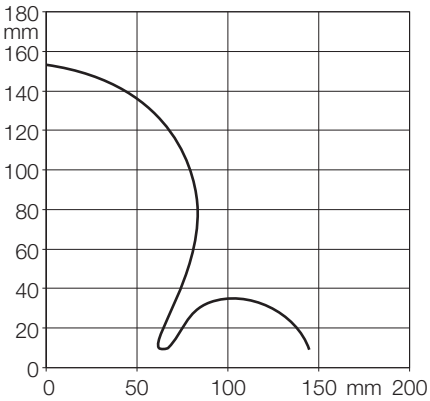
Read-write head TN-S32XL-H1147 overtravel distance with data carrier TW-R30-…B128.

Figure 41 Overtravel distance TN-32XL-H1147 with TW-R30-…B128



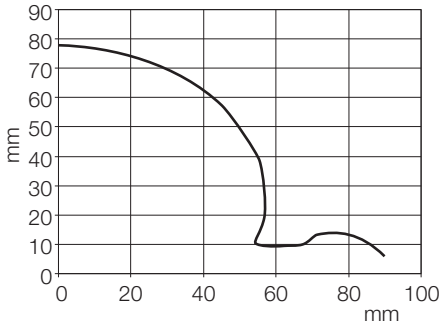
Read-write head TN-S32XL-H1147 overtravel distance with data carrier TW-R50-…B128.

Figure 42 Overtravel distance TN-S32XL-H1147 with TW-R50-…B128



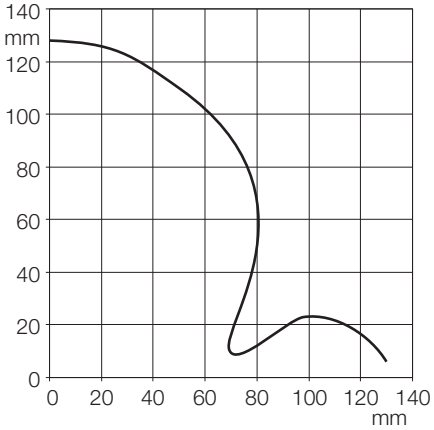
Read-write head TN-S32XL-H1147 overtravel distance with data carrier TW-R30…K2

Figure 43 Overtravel distance TN-S32XL-H1147 with TW-R30-…K2



Read-write head TN-S32XL-H1147 overtravel distance with data carrier TW-R50-…K2

Figure 44 Overtravel distance TN-S32XL-H1147 with TW-R50-…K2



9 Accessories

General description of the accessories....2

Accessories for Ø 30 mm and Ø 50 mm data carriers
- Spacer DS-R30....3
- Spacer DS-R50....4

Accessories for cylindrical read-write heads of housing style M18
- Mounting clip BS18....5
- Mounting clip BSN18....6
- Mounting clip with limit stop BST-18B....7
- Mounting clip without limit stop BST-18N....8
- Quick mounting mounts QM-18....9
- Cover cap SKN/M18....10

Accessories for cylindrical read-write heads of housing style M30
- Mounting clip with limit stop BST-30B....11
- Mounting clip without limit stop BST-30N....12
- Quick mounting mounts QM-30....13
- Cover cap SKN/M30....14

Common accessories for cylindrical read-write heads of housing style M18 and M30
- Mounting aid for BST mounting clips BST-UH....15
- Mounting aid for BST mounting clips BST-UV....16
- Inscription labels for BST mounting clips BST-BS....17

Accessories for rectangular read-write heads of housing style CK40
- Protective mounting MF-CK40-1S....18
- Protective mounting MF-CK40-2S....19
- Protective mounting MF-CK40-3S....20
- Protective housing SG40....21
- Protective housing SG40/2, temperature resistant....22
- Adjustable rail JS 025/037....23
- Cover cap T-CK40-T-FC....24
- Cover cap T-CK40-D-FC, temperature resistant....25

Handheld with accessories
- PD-ident....26
- PD-ident-WLAN....27
- PD-ident-PF....27
- PD-ident-DS....27
- PD-ident-RB....28
- PD-ident-BC....28
- PD-ident-RS....28
- PD-ident-CB....28

General description of the accessories

TURCK provides an extensive range of accessories for mounting of the data carriers and for mounting and protection of the read-write heads.

Spacers are used for mounting the Ø 30 mm and Ø 50 mm data carriers.

Suitable mounting clips as well as quick mounting mounts are available for the cylindrical read-write heads M18 x 1 and M30 x 1.5.

The adjustable rail JS 025/037 simplifies the mounting and adjustment of read-write heads for housing style CK40.

Additional protection against mechanical damage is provided by protective mountings, which also simplify mounting of the CK40 housing style.

The computer Handheld PD-ident provides a range of features for location independent writing and reading of all *BL ident* data carriers under Windows CE and is also provided with WLAN and Bluetooth functionality.

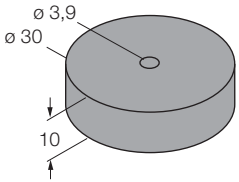
Note

Mounting accessories may possibly reduce the read-write distance Appropriate tests should be undertaken before commissioning.

Accessories for Ø 30 mm and Ø 50 mm data carriers

Spacer DS-R30.

Figure 1
Spacer
DS-R30



9

Table 1:
Spacer
DS-R30

Type	**DS-R30**
Ident-No.	6900512
Description	Spacer for data carrier Ø 30 mm
Material	Plastic

Spacer DS-R50.

Figure 2
Spacer
DS-R50

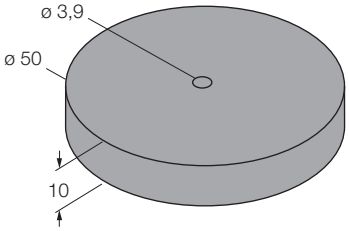


Table 2:
Spacer
DS-R50

Type	**DS-R50**
Ident-No.	6900386
Description	Spacer for data carrier Ø 50 mm
Material	Plastic

Accessories for cylindrical read-write heads of housing style M18

Mounting clip BS185

Figure 3
Mounting clip
BS185

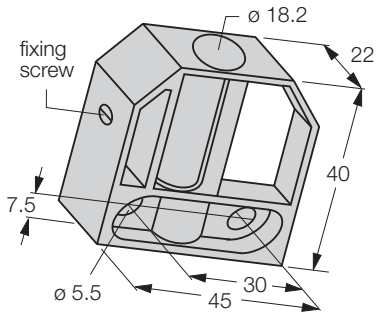


Table 3:
Mounting clip
BS185

Type	**BS18**
Ident-No.	69471
Description	Mounting clip for cylindrical read-write heads M18 x 1
Material	Polyamide

9

Mounting clip BSN18

Figure 4
Mounting clip
BSN18

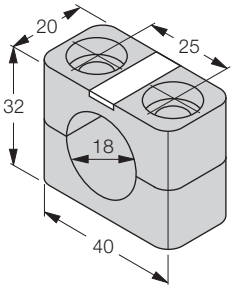


Table 4:
Mounting clip
BSN18

Type	**BSN18**
Ident-No.	69472
Description	Mounting clip for cylindrical read-write heads M18 x 1
Material	PBT

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Mounting clip with limit stop BST-18B

Figure 5
Mounting clip
BST-18B

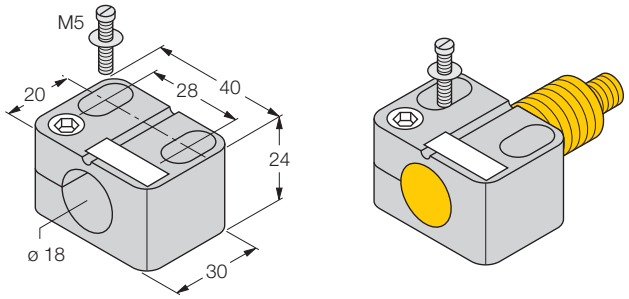

Table 5:
Mounting clip
BST-18B

Type	**BST-18B**
Ident-No.	6947214
Description	Mounting clip with limit stop for cylindrical read-write heads M18 x 1
Material	Polyamide

9

Mounting clip without limit stop BST-18N

Figure 6
Mounting clip
BST-18N

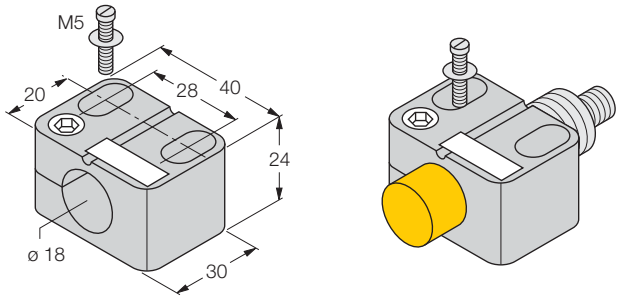

Table 6:
Mounting clip
BST-18N

Type	**BST-18N**
Ident-No.	6947215
Description	Mounting clip without limit stop for cylindrical read-write heads M18 x 1
Material	Polyamide

Quick mounting mounts QM-18

Figure 7
Quick mounting mounts QM-18

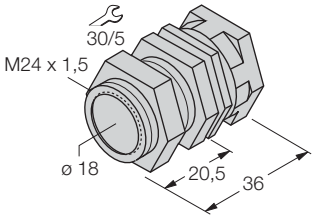

Table 7:
Quick mounting mounts QM-18

Type	**QM-18**
Ident-No.	6945102
Description	Quick mounting mounts for cylindrical read-write heads M18 x 1
Material	Chrome-plated brass

Cover cap SKN/M18

Figure 8
Cover cap SKN/ M18

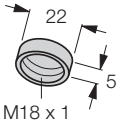

Table 8:
Cover cap SKN/ M18

Type	**SKN/M18**
Ident-No.	–
Description	Teflon cover cap for cylindrical read-write heads M18 × 1
Material	PTFE

Accessories for cylindrical read-write heads of housing style M30

Mounting clip with limit stop BST-30B

Figure 9
Mounting clip
BST-30B

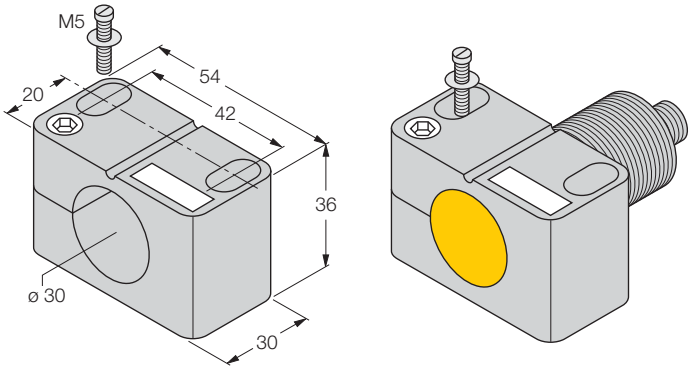

Table 9:
Mounting clip
BST-30B

Type	**BST-30B**
Ident-No.	6947216
Description	Mounting clip with limit stop for cylindrical read-write heads M30 x 1.5
Material	Polyamide

9

Mounting clip without limit stop BST-30N

Figure 10
Mounting clip
BST-30N

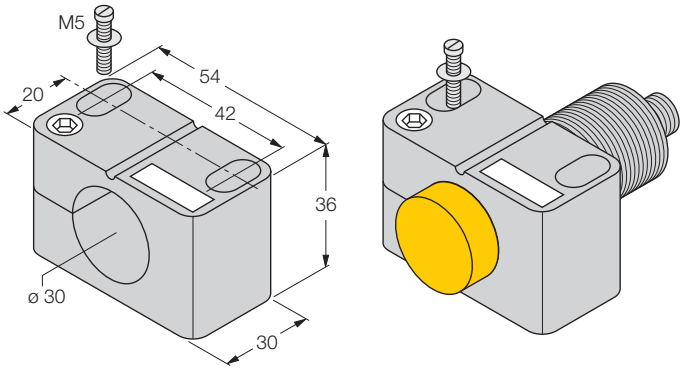

Table 10:
Mounting clip
BST-30N

Type	**BST-30N**
Ident-No.	6947217
Description	Mounting clip without limit stop for cylindrical read-write heads M30 x 1.5
Material	Polyamide

Quick mounting mounts QM-30

Figure 11
Quick mounting mounts QM-30

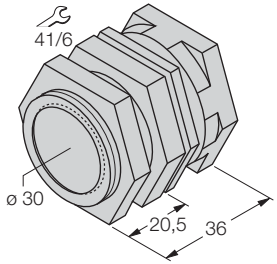

Table 11:
Quick mounting mounts QM-30

Type	**QM-30**
Ident-No.	6945103
Description	Quick mounting mounts for cylindrical read-write heads M30 x 1.5
Material	Chrome-plated brass

Cover cap SKN/M30

Figure 12
Cover cap SKN/ M30

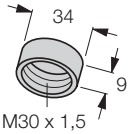

Table 12:
Cover cap SKN/ M30

Type	**SKN/M30**
Ident-No.	–
Description	Teflon cover cap for cylindrical read-write heads M30 × 1.5
Material	PTFE

Common accessories for cylindrical read-write heads of housing style M18 and M30

Mounting aid for BST mounting clips BST-UH

Figure 13
Mounting aid
BST-UH

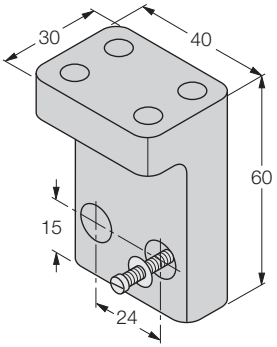

Table 13:
Mounting aid
BST-UH

Type	**BST-UH**
Ident-No.	6947219
Description	Mounting aid for BST mounting clipsfor cylindrical read-write heads M18 × 1 and M30 × 1.5
Material	Polyamide

Mounting aid for BST mounting clips BST-UV

Figure 14 Mounting aid BST-UV

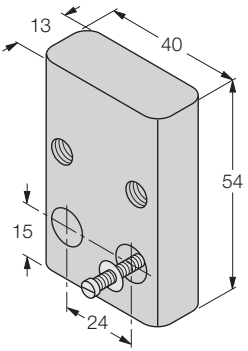

Table 14: Mounting aid BST-UV

Type	**BST-UV**
Ident-No.	6947218
Description	Mounting aid for BST mounting clipsfor cylindrical read-write heads M18 × 1 and M30 × 1.5
Material	Polyamide

Inscription labels for BST mounting clips BST-BS

Figure 15
Inscription labels
BST-BS

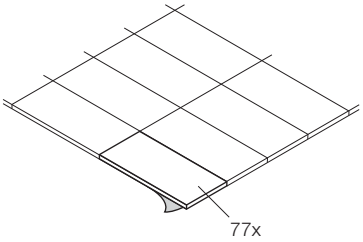

Table 15:
Inscription labels
BST-BS

Type	**BST-BS**
Ident-No.	6947220
Description	Inscription labels for BST mounting clipsfor cylindrical read-write heads M18 × 1 and M30 × 1.5
Material	Plastic

Accessories for rectangular read-write heads of housing style CK40

Protective mounting MF-CK40-1S

Figure 16 Protective mounting MF-CK40-1S

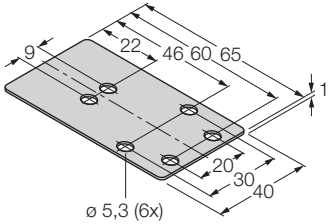

Table 16: Protective mounting MF-CK40-1S

Type	**MF-CK40-1S**
Ident-No.	6900481
Description	Protective mounting for rectangular read-write heads of housing style CK40 “single sided”
Material	Stainless steel, rust-free

Protective mounting MF-CK40-2S

Figure 17 Protective mounting MF-CK40-2S

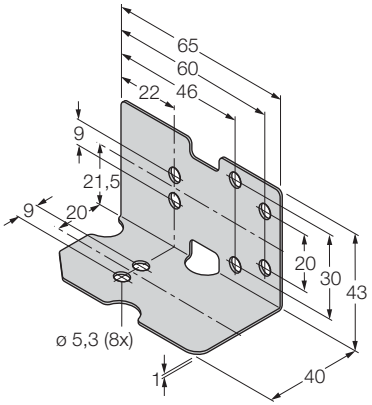

Table 17: Protective mounting MF-CK40-2S

Type	**MF-CK40-2S**
Ident-No.	6900482
Description	Protective mounting for rectangular read-write heads of housing style CK40 “angled”
Material	Stainless steel, rust-free

Protective mounting MF-CK40-3S

Figure 18 Protective mounting MF-CK40-3S

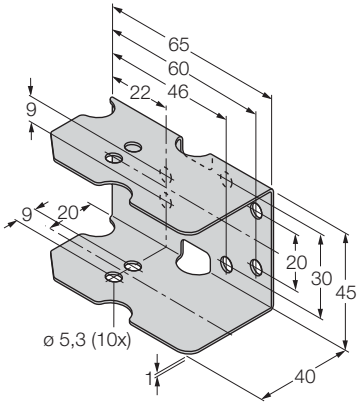

Table 18: Protective mounting MF-CK40-3S

Type	**MF-CK40-3S**
Ident-No.	6900483
Description	Protective mounting for rectangular read-write heads of housing style CK40 “U-shaped”
Material	Stainless steel, rust-free

Protective housing SG40

Figure 19 Protective housing SG40

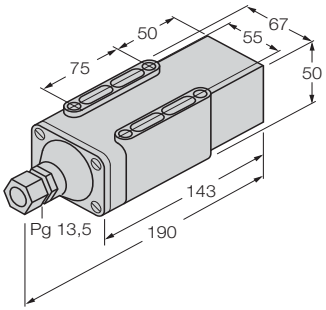

Table 19: Protective housing SG40

Type	**SG40**
Ident-No.	69500
Description	Protective housing for rectangular read-write heads of housing style CK40
Material	Polyamide

Protective housing SG40/2

Figure 20 Protective housing SG40/2

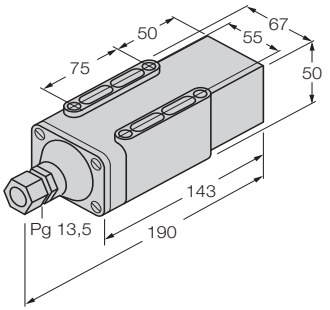

Table 20: Protective housing SG40/2

Type	**SG40/2**
Ident-No.	69497
Description	Temperature-resistant protective housing for rectangular read-write heads of housing style CK40
Material	Ultem

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Adjustable rail JS 025/037

Figure 21
Adjustable rail
JS 025/037

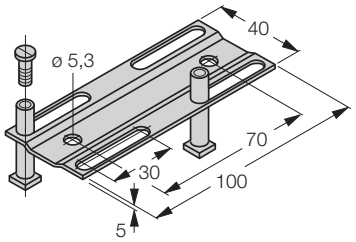

Table 21:
Adjustable rail
JS 025/037

Type	**JS 025/037**
Ident-No.	69429
Description	Adjustable rail for rectangular read-write heads of housing style CK40
Material	Stainless steel, rust-free

Cover cap MF-CK40-1S

Figure 22
Cover cap
T-CK40-T-FC

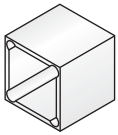

Table 22:
Cover cap
T-CK40-T-FC

Type	**T-CK40-T-FC**
Ident-No.	6900146
Description	Teflon cover cap for rectangular read-write heads of housing style CK40
Material	PTFE

Cover cap T-CK40-D-FC

Figure 23
Cover cap
T-CK40-D-FC

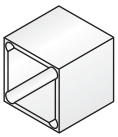

Table 23:
Cover cap
T-CK40-D-FC

Type	**T-CK40-D-FC**
Ident-No.	6900146
Description	Teflon cover cap for rectangular read-write heads of housing style CK40, high-temperature resistant
Material	Delrin

Handheld with accessories

Handheld computer PD-ident

Figure 24 Handheld computer PD-ident

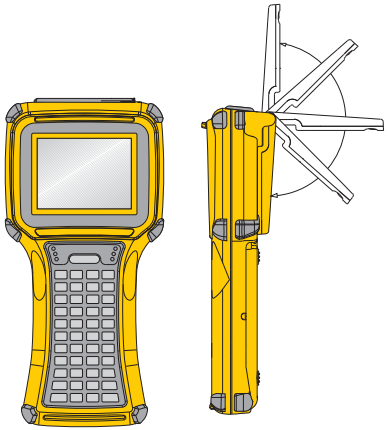

Table 24: Handheld computer PD-ident

Type	**PD-ident**
Ident-No.	1542331
Description	Location-independent reading and writing of all TURCK data carriers Windows CE Lit touch screen Protection degree IP54, opt. IP65 Programming device (handheld) Display in decimal, binary, hexadecimal and ASCII code Definition of password protected areas possible Automatic reading of data carriers incl. docking station

Handheld computer PS-ident-WLAN with WLAN functionality

Table 25: Handheld computer PD-ident-WLAN

Type	**PD-ident-WLAN**
Ident-No.	1542340
Description	Same features as PD-ident additionally with WLAN and Bluetooth functionality

Handheld accessories

Table 26: Handheld computer PD-ident-PF

Type	**PD-ident-PF**
Ident-No.	1542336
Description	Display protective file (25 pieces)

Table 27: Handheld computer PD-ident-DS

Type	**PD-ident-DS**
Ident-No.	1542333
Description	Docking station, incl. power supply, RS232 cable

Table 28: Handheld computer PD-ident-RB

Type	**PD-ident-RB**
Ident-No.	1542337
Description	Spare rechargeable battery

Table 29: Handheld computer PD-ident-BC

Type	**PD-ident-BC**
Ident-No.	1542335
Description	Rechargeable battery charger

Table 30: Handheld computer PD-ident-RS

Type	**PD-ident-RS**
Ident-No.	1542338
Description	Spare pins (25 pieces)

Table 31: Handheld computer PD-ident-CB

Type	**PD-ident-CB**
Ident-No.	1542334
Description	Pouch holder

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